

SERVER DOWN

New tools let marketers draw tons of Web customers, but is IT ready for the spikes? Page 49

EMERGING
COMPANIES
2000

EMERGING COMPANIES

100 companies to watch in the coming year.
Special insert follows page 70.

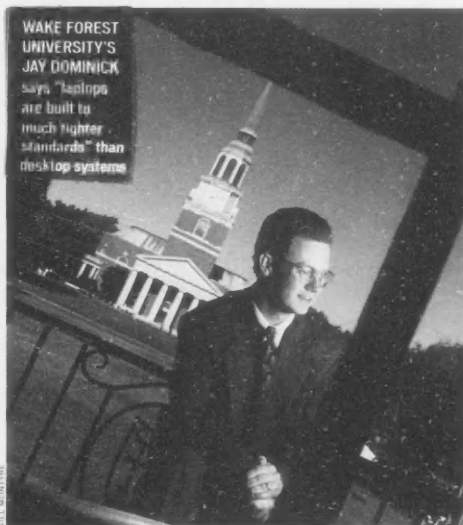
WHAT A SAP!

Columnist Frank Hayes to SAP boss Hasso Plattner: Quit acting like a jerk and address R/3 integration woes. Page 138

COMPUTERWORLD

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NOVEMBER 15, 1999 • VOL. 33 • NO. 46 • \$4 COPY



WAKE FOREST UNIVERSITY'S JAY DOMINICK says "laptops are built to much tighter standards" than desktop systems

NOTEBOOKS
OVERTAKING PCs

LAPTOP COMPUTERS have gone from curiosities to status symbols to road-warrior armament. But in the past year, increasing numbers of U.S. companies have adopted notebooks as everyday, full-time replacements for desktop PCs. That raises some new support and maintenance issues, but IT departments figure that one computer is cheaper to buy and support than two. In a special Technology section report, *Computerworld* identifies six types of business notebooks, reviews 10 of the most interesting models and takes an informed guess at what notebooks might be like in the next few years.

Report begins on page 100.

JUDGE'S FINDINGS
DON'T SWAY USERS

Microsoft users: Antitrust case won't affect IT strategies, decisions

BY DAVID ORENSTEIN, KIM S. NASH
AND PATRICK THIBODEAU

The government's big victory in court against Microsoft wouldn't have happened before a jury of corporate IT managers.

Users combined their skepticism about the speed of the legal system and their preference for Microsoft Corp.'s products, if not its business

practices, into support for the software maker.

The gist of Judge Thomas Penfield Jackson's ruling — that Microsoft has abused its monopoly power in PC operating systems to squash threatening innovations — fell flat with many of the 82 information technology

Users React, page 14

In wake of lopsided findings, DOJ, states look at interim remedies

BY PATRICK THIBODEAU, KIM S. NASH
AND DAVID ORENSTEIN
WASHINGTON

Remedies in the Microsoft Corp. antitrust case could arrive sooner rather than later, if the government — in the wake of the judge's powerful findings against the company — asks the court to impose some interim measures.

That action could come soon after Judge Thomas Penfield Jackson releases a verdict, which is expected by the end of January. The goal would be to address concerns that a lengthy appeals process could make any remedy largely irrelevant.

Trial, page 16

Mixed Reviews

Do you agree with Judge Jackson's findings that Microsoft is a monopoly and that it has stifled innovation and harmed consumers?

Base: Survey of 82 IT professionals at companies with 500 or more employees

SOURCE: COMPUTERWORLD IT INTELLIGENCE UNIT, FRAMINGHAM, MASS.



THE GLITCH THAT STOLE CHRISTMAS?

Early holiday promos
blindsided Web sites

BY STACY COLLETT

Toysrus.com is tripling the number of servers that process orders after a 1,000% increase in Web site traffic that began Nov. 7 swamped the system and turned away throngs of customers.

The spike was the result of a weekend marketing blitz: More than 62 million customers were offered free shipping through November for online purchases, \$10 off orders from first-time online customers and a free toy for orders of more than \$100.

"We are astounded at the multiple increase in orders,"

said John Barbour, CEO of Toysrus.com, a unit of Paramus, N.J.-based Toys R Us Inc.

Observers said the company shouldn't have been surprised. Online shopping is expected

to double this holiday season, from \$11.5 billion last year to \$24.2 billion this year, according to The Yankee Group in Boston — and some say that's a conservative estimate. Retailers eager to grab a chunk of the market are offering free shipping.

Holiday Sales, page 137

ERP FLOPS POINT
TO USERS' PLANS

Users back SAP, cite
need to manage IT

BY CRAIG STEDMAN

When Marty Phillips heard about the problems Hershey Foods Corp. is having with its new ERP system, he wondered:

Could the same thing happen to me?

Phillips, a vice president at Lockheed Martin Corp.'s aeronautics group in Kennesaw, Ga., is leading an enterprise resource planning project that involves SAP AG's R/3 software and consulting help from IBM — just like at Hershey. So after Hershey's delays in processing candy orders through a combination of R/3 and applications from two other vendors came

SAP, page 137

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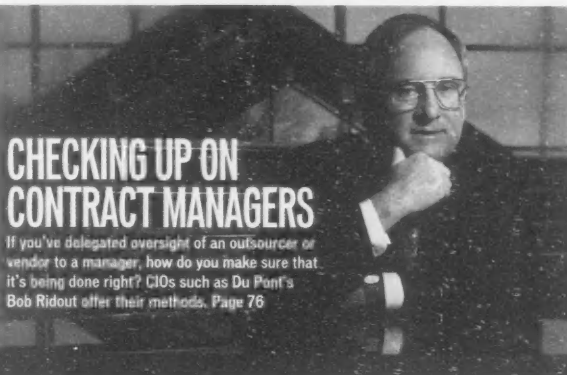
BEYOND E-SPEED

Speed isn't enough for many online shoppers like Sue Pyne (pictured). Now companies must offer a combination of speed, convenience and service, and IT organizations must rise to meet that challenge. Page 72



CHECKING UP ON CONTRACT MANAGERS

If you've delegated oversight of an outsourcer or vendor to a manager, how do you make sure that it's being done right? CIOs such as Du Pont's Bob Ridout offer their methods. Page 76



COMPUTERWORLD THIS WEEK

NOVEMBER 15, 1999

NEWS

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- 4 IT AND INDUSTRIES** worry that NBC's Y2K movie will generate panic.
 - 6 H&R BLOCK** launches a Web-based tax preparation and filing service for \$10 and less.
 - 8 SONY SAYS IT'S FIXED** a problem that accidentally exposed subscriber e-mail addresses to advertisers.
 - 10 RENTING APPS APPEALS** to users, but some aren't comfortable outsourcing complicated software.
 - 12 COMDEX PROMISES** mobile devices and wireless services galore.
 - 20 USERS FILE** second class-action suit against RealNetworks for privacy violations.
 - 24 FOUR AIRLINES UNITE** to compete with online travel firms for lion's share of lucrative market.
 - 28 HOSPITAL OUTSOURCES** IT department in \$228 million deal, marking a trend among large health care providers.
- OPINION
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 - 52 TRUCKER PICKS** the most profitable loads available with yield management software that started life at an airline.
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 - 62 JOB SITES PULL** in tons of IT résumés but spit back fewer jobs than you'd think, survey says.
- OPINION
- 62 WHISTLE-BLOWERS** threaten to expose Y2K non-compliance, warns Ed Yourdon.
 - 64 IN-HOUSE TRAINING** solves the skills shortage for some IT managers, according to Computerworld's Skills Survey.
 - 71 TOP 10 RECRUITING** tips for finding and keeping workers with the hottest talent.

QUICKSTUDY

- 86 BALANCE SHEETS** tell all for IT managers who can use them to determine the impact of IT buying decisions.
- 88 JOB HOPPING BUMPS** up pay, but only if you don't do it too often, warns Career Adviser Fran Quittel.

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- 94 A NEW APPLICATION** programming interface could make it easier to monitor both the health of your IT infrastructure and how that infrastructure affects the business.
 - 94 DENIAL-OF-SERVICE** attacks are a way hackers might use Y2K problems to bring down your systems. There are commonsense ways to protect yourself.
 - 96 RALPH LAUREN POLO** uses an object-oriented approach to speed creation of a data warehouse. Only months after beginning work, users were getting their first reports.
 - 96 NONTECHNICAL STAFF** get help creating integrated Web applications with a new tool that combines functionality for e-commerce, discussion and user groups and more.
 - 99 SAVE MONEY** on intranet groupware by using the Net News Transfer Protocol, advises author and consultant Jon Udel.
- SPECIAL REPORT
- 100 AS NOTEBOOK** computers play a more central role in your IT infrastructures, we help you sort through the dizzying array of models and the unique support issues notebooks raise.
- JOB WATCH
- 119 MANAGING IT ASSETS** is a tricky job, but if you've got the right skills — including diplomacy and communication — it can be a great career path.

SOFTWARE DOESN'T KILL COMPANIES. BAD MANAGEMENT DOES.

JOSHUA GREENBAUM, AN ANALYST AT ENTERPRISE APPLICATIONS CONSULTING IN BERKELEY, CALIF., ON THE RECENT PROBLEMS THAT SOME COMPANIES HAVE HAD AFTER INSTALLING NEW ENTERPRISE RESOURCE PLANNING APPLICATIONS. SEE PAGE ONE.

AT DEADLINE

Glitch Delays Flights

A computer glitch in Memphis International Airport's air-traffic control center grounded or delayed hundreds of planes across the country last Wednesday. The center's main computer went down at around 1:45 p.m. Eastern Standard Time but was back online by 3 p.m., according to the Federal Aviation Administration. While the main system was down, the air-traffic control center relied on its backup system.

Y2K Flights Canceled

Citing low demand, Frontier Airlines Inc. said it has canceled 52 flights between Dec. 31 and Jan. 1. Denver-based Frontier said the cancellations weren't the result of safety concerns. The company also said it has been working with The Boeing Co. to complete software remediation for its fleet of airliners.

Dell Meets Forecast

Dell Computer Corp. posted profits of \$483 million on \$6.78 billion in revenue for the most recent quarter. Profits were up from \$384 million posted during the same period last year—but down 4.6% from the previous quarter. In October, Dell warned it would post lower earnings due to higher memory chip prices.

Win 2K Beta Goes Live

Barnesandnoble.com LLC will run Windows 2000 beta code on an eight-way cluster for an important application this holiday season, said CIO Gary King. The company will use a cluster built by Compaq Computer Corp. running Windows 2000 Advanced Server. The application is written with Visual Basic Component Object Model components.

Oracle XML Tool

At its OpenWorld '99 conference in Los Angeles this week, Oracle Corp. plans to announce application integration software based on Extensible Markup Language (XML). The Oracle Integration Server includes packaged adapters to Oracle business applications and products from rivals such as SAP AG. As a prelude, Oracle last week released XML development tools for beta-testing.

It's Only a Movie, But Y2K Raises Real Concerns

Utilities, banks seek previews from NBC, gear up for surge in customer calls

BY KATHLEEN MELNYUKA

SURE IT'S ONLY make-believe, but concerns raised by a forthcoming NBC movie about year 2000 are real.

Y2K, scheduled to air on NBC Sunday night, is billed as a suspense thriller about a year 2000 troubleshooter trying, as the network bills it, to "save the world from catastrophic disaster" on New Year's Eve.

But the film is causing headaches for a variety of industries. "A movie that exacerbates fears or plays to people's darker side will result in lots of money being spent by industries just protecting themselves," said John Castagna, a spokesman for the Edison Electric Institute, a Washington-based trade group for the electric power industry.

Representatives of the energy and financial industries and state officials around the U.S. have asked to preview the film to see what issues it raises, but NBC has so far refused. "We were just hoping that we could be prepared to answer those questions that we think we are going to get asked," said Terrell Halaska, a spokeswoman for the National Governors' Association in Washington.

Correction

A Nov. 8 News story ["ERP Mix a Challenge in Drug Merger," page 6] mistakenly cut part of a quote by Stephen Cole, an analyst at Forrester Research Inc. in Cambridge, Mass. The full text of the paragraph in which Cole commented on the proposed merger between American Home Products Corp. and Warner-Lambert Co. should have read: "In most acquisitions, the buyer dictates business and technology strategies. But in megamergers like this, it's never that simple," Cole said."

President Clinton said in the government's Y2K wrap-up report last week that he expects "no major national breakdowns as a result of the year 2000 date change." But Hollywood's script includes a major power outage on the Eastern Seaboard, so some real-world power companies are gearing up in anticipation of customer response.

At PECO Energy Co. in Philadelphia, Y2K project manager Mickey Galatola's call center will be ready after the film airs. "On 9/9/99, we weren't anticipating the calls we got," she said, "and we had to shift hours to make sure our phones were manned. As a result of that, we have decided to be staffed up for after the Y2K movie."

Castagna said he fears that

the film will inspire hackers and suggests that companies be on guard for security threats.

But John Hall, a spokesman for the American Bankers Association, said he's confident that customers will be able to tell the difference between fact and fiction.

Hall said he sees the movie as an opportunity to educate consumers. "Sometimes at the end of a TV movie there's a lead-in to the 11 o'clock news" commenting on the film, he says. "We'd like to be part of it."

That's what the Chicago mayor's office is doing. Barrett Murphy, a director there, has arranged to work with the local NBC affiliate on a news tie-in immediately after the movie. "They want us to assist in calming public fears," Murphy says. "The tie-in will tell what we've done and how it's really going to be. We don't expect anything to go wrong."



Y2K 'Scenarios'

Some events in NBC's upcoming Y2K: The Movie:

- Eastern Seaboard loses power
- National Guard called to evacuate Seattle because of imminent nuclear meltdown
- Woman dies during surgery when backup generators fail
- U.S. orders all domestic flights grounded at 11:30 p.m. on Dec. 31; some aren't
- At 2 a.m., a Swedish nuclear reactor unexpectedly melts down, kills entire staff

BP Amoco Hires Big 5 Firm To Run SAP Financial Apps

\$1.1B, 10-year deal with Price part of cost-cutting plan

BY STACY COLLETT

British oil giant BP Amoco PLC last week outsourced its U.S. accounting processes and related information systems to PricewaterhouseCoopers in a 10-year, \$1.1 billion deal.

The deal is one of the largest business process outsourcing agreements ever. It's also the first time the accounting and consulting firm has taken on management of a company's related enterprise resource management applications.

"We see many [business process outsourcing] deals and lots of application support deals, but in this one, the two have been integrated," said

Cynthia Doyle, an analyst at International Data Corp. in Framingham, Mass.

Under terms of the contract, PricewaterhouseCoopers will support BP Amoco's financial software from SAP AG, according to Charles Kafoglis, a partner in the accounting firm's energy practice. It will also handle accounting support applications such as Pre-mas, an oil and gas production and revenue system licensed by PricewaterhouseCoopers.

The New York company will also acquire BP Amoco's accounting and application systems group, which is based in Tulsa, Okla., and has employees in Chicago and Houston as well. The group supports BP Amoco's upstream and chemical operations in the U.S. About 1,200 employees, including 300 SAP-trained staffers, will join

PricewaterhouseCoopers in those locations.

The move comes as BP Amoco looks to cut \$2 billion annually in operating expenses. While BP Amoco officials wouldn't disclose how much they expect to save through the outsourcing deal, "our experience is that 10% to 20% is not uncommon in an outsource," Kafoglis said.

BP Amoco already outsources downstream accounting processes to Andersen Consulting in Chicago.

Decisions about outsourcing similar functions at Los Angeles-based Atlantic Richfield Co., which BP Amoco agreed to purchase in April, will wait until the deal gets regulatory approval, officials said.

Amoco began using SAP enterprise resource planning software in 1995, and its last business component went live late last year.

PricewaterhouseCoopers was one of three implementation partners on the project. Today, BP Amoco supports 16,000 SAP users worldwide. ■



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Scared of the BubbleBoy? Patch Your Holes

BY ANN HARRISON

The BubbleBoy Internet worm that surfaced last week doesn't do any damage and in fact takes advantage of a software hole in Microsoft Corp.'s Outlook product for which a patch was issued months ago.

The attack strategy does circumvent the usual method of spreading a virus, which typically requires users to open an e-mail attachment before the virus launches.

"It's a new concept, but we see new concepts every week, and there is nothing special about this one, especially since it is infecting no customers," said Darren Kessner, a senior virus researcher at the Symantec AntiVirus Research Center in Santa Monica, Calif. "It's more hype than actual danger right now."

BubbleBoy can attack systems running Internet Explorer 5 on Windows 98, Windows 2000 and other Windows operating systems with the Windows Scripting Host installed. It exploits a known security hole in Outlook to insert a

script file, UPDATE.HTA, into the Programs/StartUp folder of the Start menu. It then e-mails the worm to everyone in a user's Outlook or Outlook Express address book.

A patch for the hole is at www.microsoft.com/security/Bulletins/ms99-032.asp. It was posted Aug. 31. "The best thing for network administrators to do is to keep up with patches

for software that is running on the network," said Kessner. The BubbleBoy worm won't run if viewed through the preview pane in Outlook that allows users to preview the mail without opening it. However, in Outlook Express, the worm can be activated even when viewed through the preview pane. ■

H&R Block Prepares For Online Returns

As two competitors launch similar idea

BY THOMAS HOFFMAN

H&R BLOCK INC. is getting a jump on the 1999 tax season, launching an aggressive Web-based tax preparation and filing service for the more than 80 million people who now use shrink-wrapped software or pencil and paper to file their tax returns.

The venerable Kansas City-based tax service has several strengths in its corner, including a trusted brand name, attractive pricing (see chart) and a growing population of computer-savvy Generation Xers who are inclined to file their taxes online. That's not to mention a congressional mandate to have 60% of all tax returns filed electronically by 2002 and 80% by 2007.

Do-it-yourselfers "never walk into H&R Block offices, and that's who we're going after,"

H&R Block's New Filing Service

USE OF TAX SOFTWARE is free until the user is completely satisfied and wishes to print or file return.

COST IS \$9.95 TO PREPARE and file a federal return, \$4.95 for a state return. Federal 1040EZ filing is free; no additional charge to electronically file; 24-hour refunds cost \$19.95.

EACH RETURN is guaranteed to be mathematically accurate.

said Aaron Horvath, manager of interactive marketing. The company is still trying to determine how much additional revenue the Internet services should deliver, he said.

The company plans to take down its Web site next month and replace it with the new tax filing features Jan. 12. Horvath said the investment is in the seven-figure range, but he declined to provide details. Under the plan, customers will visit its Web site and use a browser-based version of its retail software to prepare their taxes. Customers won't have to pay to use the software until they have completed their returns and filed electronically, said Horvath.

The cost of using shrink-wrapped software to prepare tax returns ranges from \$19.95 to \$45, excluding coupons and rebates, said industry experts.

Still, the company faces competitive pressures and the risk of reducing some of its 18 million customers, who typically spend \$80 to \$100 to have an H&R Block accountant prepare their taxes.

In addition, CCH Inc., a Riverwoods, Ill.-based tax research and publishing firm, said it plans to offer Web-based tax preparation and filing ser-

vices for just \$7.50 for both state and federal returns. The firm, a top provider of professional software for tax preparers, is announcing its Complete Tax service (www.toolkit.cch.com) for small businesses and consumers this week.

Meanwhile, Irving, Texas-based H. D. Vest Inc. announced Friday that it plans to allow consumers to prepare and complete their 1999 tax returns for free on its Web site (www.hdvst.com) regardless of income or complexity.

The company hopes the service will build its brand recognition among consumers, as well as encourage them to use the firm's other services, such as optional referral to a Vest financial adviser.

The CCH spokeswoman said her company is negotiating with several top Web sites for the right to provide its Complete Tax service directly from their sites. That may be key in helping CCH draw the kind of sales volume needed to compete with H&R Block, industry experts said.

"If they could get one of the bigger names, like a Yahoo or an AOL, that would be a big help," said Jim Lears, a tax member at Clifton Gunderson LLC in Baltimore. ■

Oracle Gets More Mobile

BY DOMINIQUE DECKMYN

Oracle Corp. last week rolled out its Oracle8i Lite database on two key mobile platforms — the Palm OS and Psion PLC's EPOC — and updated a version for Windows CE. The database will allow users to synchronize data on their handheld devices with Oracle database servers.

Jill House, an analyst at International Data Corp. in Framingham, Mass., said that although Oracle8i Lite is late to market, it's an encouraging sign that Oracle considers the Palm a strategic platform. Last week, Oracle also started shipping Portal-to-Go, an application announced last month that publishes database information to handheld systems and cellular phones. Oracle8i Lite, which works with Oracle7.3 and later versions, is priced at \$295 per named user.

Bidcom Inc., which provides services to the building industry, has been using a beta version of Oracle8i Lite as part of an application that San Francisco building inspectors use for on-site inspections at a road, rail and pedestrian connection on the waterfront. Larry Chen, chief technology officer at the San Francisco-based company, said Bidcom selected Oracle8i Lite over alternatives such as Sybase Inc.'s SQL Anywhere because the company is already using an Oracle database. "In general, you want to deal with the least number of vendors," Chen said. He also said he was impressed with the product's two-way replication features.

San Rafael, Calif.-based Autodesk Inc. is also developing an application based on Oracle8i Lite. Code-named Maui, it will display maps on a Palm or Windows CE device. /

But Phillip Redman, an analyst at The Yankee Group in Boston, said 8i Lite's link to the Oracle database may be a drawback because, unlike competing products, Oracle's won't work with competing databases. "If someone is looking for an enterprise solution that must access multiple databases, this could be an issue," he said. ■

JUST THE FACTS

Does BubbleBoy Own Your PC?

■ When the body of an e-mail message infected with BubbleBoy is opened, it will contain a black screen and the text "The BubbleBoy incident, pictures and sounds," along with an invalid Web site address ending in bblboy.htm. The only way to know a machine is infected is when the system's registered owner and organization are changed via the registry to BubbleBoy and Vandelay Industries.

Web Push Will Mean Layoffs

BY THOMAS HOFFMAN

Allstate Corp. said it would eliminate roughly 10% of its workforce — or 4,000 non-agent positions — as part of an effort to channel more sales volume over the Internet and through direct marketing.

Expected to reduce expenses by \$600 million annually, the move includes plans to roll out e-commerce capabilities to customers in 16 states beginning in May and to cover 40%

of the U.S. population by the end of next year.

Allstate is the largest publicly held personal insurance company in the nation, providing insurance to more than 14 million households in the U.S. and Canada.

The company also is planning to spend about \$700 million during the next two years in systems development, implementation, rollout costs and advertising. ■

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BRIEFS

IP Surveillance
Spec Rejected

Despite the FBI's support of the idea, the Internet Engineering Task Force (IETF) last week voted against including specifications for surveillance technology in the IP network telephony standards it develops. A formal position on the issue is expected from IETF advisory and steering groups, but no formal date for a statement has been set.

Equifax Inks Deal
With Federated Stores

Cincinnati-based Federated Department Stores Inc. signed a multiyear contract with Atlanta-based Equifax Inc. for its credit marketing services, recovery and collection services and risk assessment and management tools. These include credit reports, risk scores, portfolio review and custom predictive models.

United Uses HP Boxes

United Air Lines Inc. has installed 108 of Hewlett-Packard Co.'s high-end Unix servers to power its worldwide flight-crew scheduling, cargo scheduling, pricing, Web-based communication and intranet applications. Three 32-processor HP 9000 V25000 servers support the Chicago-based carrier's flight-crew scheduling system, and three eight-processor HP V2550 systems support United's cargo management and pricing system.

AT&T Self-Service
Telecom in the Works

AT&T Corp. last week announced what it called the AT&T Business Network, services that would include voice and data services plus self-management of services via the Internet. AT&T said the bundled offering will be widely available by the second quarter of next year. Pricing will depend on the services used.

Tivoli Network Tools

IBM's Tivoli Systems Inc. in Austin, Texas, announced last week that it would provide network management tools for Internet service providers.

Sony Site Exposes
E-Mail Addresses

Apology says data wasn't used, flaw fixed

BY ANN HARRISON

SONY MUSIC Entertainment Inc.'s "InfoBeat" online newsletter disclosed last week that a software flaw inadvertently exposed subscribers' e-mail addresses to advertisers. The announcement occurred in the wake of concerns over the release of customer data by products developed by RealNetworks Inc. in Seattle (see story, page 20), and subsequent scrutiny of on-line profiling.

New York-based "InfoBeat" offers music and entertainment news and advertising to about 2.5 million people. In a letter to subscribers, Sony acknowledged that "certain advertisers had the ability to obtain the e-mail address of a user who clicked on the link" in ads in the newsletter.

Although Sony said it fixed the problem, which it discovered last month, it suggested that subscribers set up passwords to access the service. The letter assured subscribers that the company has contacted advertisers who "confirmed that they did not collect or use any of this information." Sony wasn't immediately available for comment.

"There was never any intent from us whatsoever to benefit from or use this information,

which was inadvertently obtained, and we've been assured from our advertisers that this information was not used in any way by them," the company said in a statement.

"InfoBeat" officials said the back-end software on the site

was created by Exactis.com Inc. in Denver. Exactis said no other companies were affected by the glitch, and the problem has been corrected.

The inadvertent release of consumer data has the potential to make a company look bad, especially if it doesn't address the problem swiftly, said Kurt von Zumwalt, a spokesman for Nissan North America

Inc. in Gardena, Calif. Nissan North America weathered a similar incident in April when a Web site promoting the company's Xterra vehicle mistakenly exposed e-mail addresses visitors had submitted in the process of requesting more information on the product. Nissan viewed the data breach as just another crisis that required immediate communication, said von Zumwalt.

"You only look worse the longer you put off dealing with it or if you are not really forthcoming," said von Zumwalt. "Tell the consumers what happened [and] that you are sorry — and do what you can to make sure that it doesn't happen again." ■

IBM, Sun Donate XML to Apache Foundation

Means more options for
open-source developersBY LEE COPELAND
AND CAROL SLIWA

IBM, Sun Microsystems Inc. and a cadre of other vendors last week donated Extensible Markup Language (XML) utilities to the Apache open-source fold, bolstering the options available to developers who want to build new features into their applications.

Noted as a key standard to allow Web applications to interchange data, XML continues to gain support in the industry. The Apache Software Foundation acts as the repository for Apache's open source code. Its president, Brian Behlendorf, said the Forest Hill, Md.-based organization's aim is broader than merely

adding XML support to the Apache Web server.

"There's been a lot of activity in the open-source community around XML," he said. "What we wanted to do was combine the best of all worlds and build a set of reference libraries, parsers, applications around XML — the idea being that we could help enforce the XML standards process by saying, 'Here's a common tool set everyone can use.'"

IBM and Sun contributed XML parsing utilities. Lotus Development Corp. donated its Extensible StyleSheet Language transformation engine for translating between XML documents and other documents. DataChannel Inc. in Bellevue, Wash., Bowstreet Software Inc. in Portsmouth, N.H., and Exoffice Technologies Inc. in Burlingame, Calif., also gave XML data-access,

formatting and printing utilities, respectively. By donating the new code offerings, vendors hope to curry the favor of Apache developers as XML usage grows, analysts said.

"This is a very serious battle for developer hearts and minds," said Martin Marshall, an industry analyst at Zona Research Inc. in Redwood City, Calif. "The issue still out on XML is, how vendor-neutral is it? It appears that proprietary paths are appearing."

Phil Costa, an analyst at Giga Information Group Inc. in Cambridge, Mass., noted that the open-source XML parsers had already been available. "Given that Apache is the most prevalent server on the Internet, it's sort of an obvious direction for [the Apache Software Foundation], to incorporate XML as part of that [Web environment]," Costa said. ■

HP Opens Up Web Developer Software

BY JAIKUMAR VIJAYAN

Hewlett-Packard Co. is making it easier for Web developers to build sites that can more efficiently exchange information and negotiate services with each other. HP last week announced that it will make the source code of its e-speak Web brokering software freely available to developers.

E-speak is an HP software technology that provides a

common interface for heterogeneous Web services — such as a travel site and an online ticket reservation service — to communicate with each other over the Web. Using the software, Web developers can build sites that are capable of automatically finding and serving up services from other e-speak-enabled sites.

For instance, an e-speak-enabled real estate site would

be able to automatically search for and present the best mortgage deals available for a piece of property from similarly enabled sites. Or businesses could use it to find a supplier with the best delivery and logistics capabilities and price with a single request.

By making the dialogue that has to occur among various sites based on one standard, HP can help companies quick-

ly expand the capabilities of its Web services, said Ed Black, an analyst at Aberdeen Group Inc. in Boston.

"The key to e-speak's success depends on how quickly it is adopted and the ubiquity of its use," Black said. The more e-speak-enabled sites there are, the more effectively the technology can be used, he said.

HP will make the e-speak source code available online Dec. 8 at www.e-speak.net. Before then, the company will make beta code available at www.e-speak.hp.com. ■

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Renting Microsoft Office Applications Appeals to Users

BY DAVID ORENSTEIN

Users hungry for more flexible software licenses are warming

to the nascent market for renting applications. That market leapt forward

last week when Microsoft Corp. and several application service providers made Office 2000

available online.

Microsoft's offering will be based on Windows terminal

servers running Office 2000 either at application service providers or on its bCentral portal for small businesses. Core applications such as Word, Excel, PowerPoint, Access, Publisher, FrontPage and Outlook will be available.

Also last week, Corel Corp. in Ottawa announced that it will make WordPerfect available online through FutureLink in San Francisco. And Sun Microsystems Inc. said that the launch of its office application rental site, StarPortal, will be delayed into next year.

Suite Gets High Sign

Microsoft received most of the attention from observers. "When the world's largest software company announces that the world's leading personal productivity suite is available through the world's most significant access method, a major inflection point has occurred," wrote analysts at Zona Research Inc. in Redwood City, Calif. "We believe the demand for Office Online will be strong."

Sterling Capital Ltd. in Baltimore, an investment company that owns several companies with a total of 6,000 employees, is experimenting with Office 2000 online at one of its holdings, Sterling Learning Systems, said CIO Steven Fragapane. Eight Atlanta and three Boston franchises will rent all their information technology equipment from TeleComputing Inc. in Fort Lauderdale, Fla.

Fragapane said renting is ideal because Sterling intends to sell the locations back to the franchisor, which would replace the franchise systems anyway. "I didn't want to have staff to fire," Fragapane said.

Fragapane said he's optimistic but can't predict that Sterling would begin using application service providers for other business units, such as ones with inventory or transactions. The complexity and scale of those applications might be too great, he said.

Some users just want flexibility on price and don't care to outsource their IT.

John Bullock, director of IT at Valley Presbyterian Hospital in Los Angeles, said he likes the idea of monthly licensing for Microsoft Office but would prefer to run it locally. ■

Senior editor Dominique Deckmyn contributed to this story.

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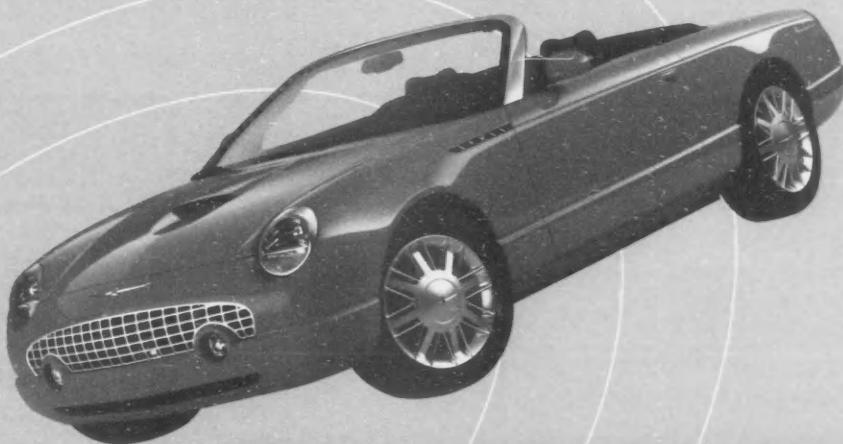
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Wireless Tops Agenda

20th annual show big on mobile technology

BY DOMINIQUE DECKMYN
AND MATT HAMBLIN

COMDEX, 20 YEARS old this week, promises 200,000 visitors to the Las Vegas desert a view of a world "beyond the PC."

It's a world that's filled with handheld computers and smart

phones, some connecting workers to corporate headquarters or the Internet via wireless networks.

Compare that with 1979, when Ethernet and the Intel 8080 were the hot technologies at Comdex, then in its first year, with 160 exhibitors. About 4,000 people attended.

This year, "I think the inte-

gration of wireless and handheld computing [into corporate information technology] is going to be talked about a

lot," said Gerry Purdy, president and CEO of Mobile Insights Inc., a Mountain View, Calif.-based research firm.

Open Sky, a joint venture of 3Com Corp. in Santa Clara, Calif., and Aether Systems Inc. in Owings Mill, Md., today will roll out its highly anticipated wireless Internet service for users of the Palm V. Purdy said the service, which is expected to include a modem from San Diego, Calif.-based Novatel Wireless Inc., will allow users to view text and graphics on the Web. "Everyone is going to want one of these," he said.

Other vendors are rushing to roll out services aimed at wireless users with limited bandwidth and small screens. Nokia

Corp. in Irving, Texas, and Sabre Holdings Corp. in Fort Worth, Texas, will demonstrate a travel information service that gives users real-time access to airline information from their cellular phones, using the wireless access protocol.

Among the mobile computing demonstrations, speech-recognition software vendors will show how dictation software can be used with laptops or handhelds. Dragon Systems Inc. in Newton, Mass., will announce Version 4.0 of its speech software, NaturallySpeaking Mobile Organizer.

Lernout & Hauspie in Burlington, Mass., will demonstrate hardware products from several partners that use its Voice Express dictation software. Those include wearable computers from VIA Inc. in Northfield, Minn., and a 4-lb. tablet computer called the Qbe from Aqcess Technologies Inc. in Santa Ana, Calif.

The wireless division of San Jose-based Acer America Corp., Acer NeWeb, will be one of many vendors demonstrating wares based on the Bluetooth standard for short-distance wireless connections between devices. For example, Bluetooth will let laptops communicate wirelessly in a meeting room without having to be aligned, as they must be with infrared connectivity. ■

Reaction to \$499 PC Mixed

Low price not good enough for some

BY JAIKUMAR VIJAYAN
AND DOMINIQUE DECKMYN

Users and analysts offered diverging opinions on the corporate impact of Compaq Computer Corp.'s \$499 iPaq PCs announced last week.

Analysts said the systems would be cheaper and easier to manage than regular PCs in the long term. But corporate users said they weren't impressed.

"At the prices of today's [PCs], why bother?" said Bob Hacker, systems manager at Binney & Smith Inc., the maker of Crayola products, in Easton, Pa. Some of his 600 users will still need a full-size PC, so he will stick with one model for everyone, he said.

The iPaq, which will ship in January, is based on Intel Corp.'s Celeron and Pentium III chips.

Like Apple Computer Inc.'s iMac, Compaq's "legacy-free" iPaq model works only with devices and peripherals based on the Universal Serial Bus (USB) standard to reduce compatibility problems. A standard iPaq line will support current ISA, serial and parallel port technologies.

All iPaqs will be available in four configurations and share the same components. Most will be shipped to customers directly.

iPaqs will come with a one-year warranty during which Compaq claimed it won't make

JUST THE FACTS Compaq's iPaq

Price: \$499
Processor: Intel 500-MHz Pentium III or Celeron
RAM: 64M bytes standard, maximum of 512M bytes
Storage: 4.3G-byte hard drive standard
OS: Support for Windows 95/98 and Windows 2000
Other: Weighs 10 lb., occupies 75% less desktop space than a standard desktop PC

changes to configurations, components, software or drivers.

These factors should help reduce complexity and costs associated with regular PCs, said Andrew Neff, an analyst at Bear, Stearns & Co. in New York. "It's the right product at the right time," Neff claimed.

The fact that iPaq is a full-featured, low-cost PC should attract corporate users, said Jim Liang, an analyst at Morgan Stanley Dean Witter & Co. in New York.

That's not enough to convince users like Brandon Weiner. For one thing, the Celeron isn't a great processor for running corporate applications, said Weiner, an information technologies manager at Priority Pharmacy Inc., a mail-order pharmacy in San Diego.

If the system doesn't have a parallel or serial port, that would be a problem, said John Bullock, director of information systems at Valley Presbyterian Hospital in Los Angeles.

"We have a lot of [parallel port] printers out there," Bullock said. ■

Software Builds Custom Sites

Start-up debuts Web Automation Factory

BY CAROL SLIWA

Faced with the challenge of presenting personalized Web pages to business partners and customers, some companies are turning to software that can eliminate the hassle of recoding applications to deliver customized content.

The server-side software was announced last week by Bowstreet Software Inc. in Portsmouth, N.H.

Using Bowstreet's Web Automation Factory, companies can assemble software components that contain the content and business processes they want to distribute. Those components are stored in corporate directories as Extensible Markup Language (XML) data.

Templates stored in the directory specify how the components can be combined to create a Web page or site on

the fly, and profiles dictate which content a particular end user can access.

To allow applications to use and exchange information from disparate directories, the product employs the emerging Directory Services Markup Language, which is backed by IBM, Microsoft Corp., Oracle Corp. and Novell Inc.



SABRE LABS' Bob Offutt says he needs tools to dynamically manage content

NetRatings Inc. in Milpitas, Calif., finds the technology helpful for delivering Web audience measurement statistics to two of its partners that sell Internet advertising.

NetRatings' data is hard-coded in HTML tabular format, making it difficult to deliver detailed breakdowns or subsets of desired data to partners in

their format of choice. But Bowstreet's software converts the data into XML for flexible delivery.

Templates build the application, or Web page, by pulling the components from the directory. The content varies based on the user profile.

NetRatings CEO Dave Toth

MORE THIS ISSUE

For more information on laptop computers, turn to page 100.
www.computerworld.com/more

said he hopes the Bowstreet software will allow him to offer subsets of data to customers at lower prices.

Sabre Labs, the technology arm of Fort Worth, Texas-based Sabre Group Inc., is testing the Bowstreet product to manage the increasing volume of content that will be delivered through its Online Requester Web site, due next month. Online Requester aims to give travel agents (and eventually individual customers) access to expanded offerings, such as bed and breakfasts and event tickets.

Setting up a directory with profiles will let Sabre provide different sets of content. XML will help the company catalog the content. For instance, the term *bed and breakfast* may be common in the U.S. and the U.K., but *bed and bath* is more common in Australia. Affixing the same XML tag to all of those sets of information will ensure that agents get the full breadth of listings, even with variations in terminology.

"As content and complexity grow, we have to manage that dynamically, and we need tools," said Bob Offutt, a vice president at Sabre Labs.

Analysts called the Bowstreet technology innovative and promising. The Web Automation Factory sells for \$250,000. ■

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Continued from page 1

Users React

managers surveyed by *Computerworld* as well as with users interviewed

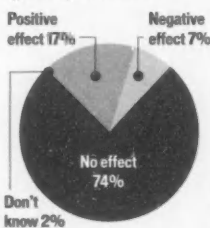
More users than not (46% vs. 39%) said they disagreed with the judge, according to the telephone survey. Although most users (62%) said Microsoft has no real competition in desktop operating systems, two-thirds (67%) of the users said they don't believe Microsoft has hurt innovation in IT. Almost three-quarters (74%) said the judge's findings of fact won't affect their businesses, and 93% said they won't affect the way they do business with Microsoft.

"Microsoft is moving much faster than the court system," said Brian Kilcourse, CIO at Longs Drug Stores Corp. in Walnut Creek, Calif.

Kilcourse said Microsoft has certainly been aggressive in dealing with rival vendors, but he declined to judge whether the company acted illegally. More important, he said, is that the court's action won't affect IT at Longs. "We've been rolling out Microsoft products left and right," he said. All Longs stores, for example, will

No Effect

Do you think Judge Jackson's findings will have a positive effect, a negative effect or no effect on your business?



How will the findings affect how you do business with Microsoft?



Base: Survey of 82 IT professionals at companies with 500 or more employees

run Windows NT 4.0 servers and clients as well as Microsoft

Office. "We don't think [Jackson's findings are] going to have any near-term impact."

Ultimately, many users expect that Microsoft will face a penalty of some kind, and they recommended a variety of options, ranging from a fine to the breakup of the company. Two CIOs suggested that Microsoft should share all Windows application programming interfaces (API) publicly to even the software development playing field.

On Redmond's Side

But some users interviewed flatly sided with Microsoft, especially because its ubiquity provides an important standard for their computing needs.

"I don't think they should be hit like this," said David Delfiner, a network engineer at Champion International Corp. in Stamford, Conn. Approximately 650 users at the paper company use Windows NT 4.0.

Not only was the antitrust suit a product of sour grapes among competitors, but changes in the industry have made the issues irrelevant, Delfiner said. "[America Online Inc.] was crying, 'Ow, ow, ow, Microsoft is hurting us.' And look where they are now

— doing very well," he said.

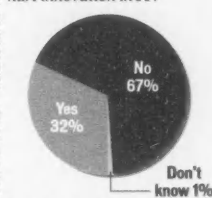
Chester Merithew, MIS director at Republic National Cabinet Corp., an 800-employee manufacturer in Marshall, Texas, agreed, saying, "I don't think there is a problem."

Microsoft software rose to its dominant position because users wanted it, Merithew said. As an IT manager at a different company in the 1980s, Merithew said, he chose Microsoft software because it supported more business applications. He still likes Microsoft software, he said, because of the smooth integration of its applications with the operating system — precisely the bundling that Jackson found to be abusive to Microsoft's competitors.

Microsoft's monopoly is a good thing for businesses, said Alan Sauerbrei, information systems manager at Wright Brands Foods Inc., a Vernon, Texas, food manufacturer. "I view it overall as a good thing for the general industry. To make an argument that overall they hurt [technical] advancement to me is crazy," he said. "The idea that Quicken can sell for \$35 or \$40 is based on the idea that they could write for one operating system. If they had to write a version and do research and development for

Who's Hurting?

Do you believe Microsoft has hurt innovation in IT?



Base: Survey of 82 IT professionals at companies with 500 or more employees

five operating systems, we would be paying \$300, not \$35.

"Overall, [Microsoft] provided a standard that lets everyone else work on the next level of improvement," said Sauerbrei.

Whether they agree with Jackson and the government or Microsoft, most users believe that some remedies will occur and suggested that they shouldn't upset the standard that Windows provides.

Changing Competition

Elf Atochem North America Inc. CIO Bob Rubin said Microsoft should open up all the APIs in Windows so that competitors can innovate on top of Windows just as Microsoft can. "If we do these things, Microsoft, which is a vigorous, strong company, will have to compete on the quality of their products and price, rather than [by] keeping people out of their markets," Rubin said.

Ching Weng, a senior information process manager at AlliedSignal Corp. in Torrance, Calif., said he agreed with the court's findings but added that he has mixed feelings about the ultimate role of government in fixing the problem. The computing industry "needs the freedom," said Weng. "It doesn't need a lot of regulation, because the freedom gives us everything we need to invent new things," he said.

In the survey, two-thirds (66%) of IT managers said the best solution for preventing monopolies in IT is a combination of moderate government regulation and market forces. Thirty percent said no government regulation at all should take place, and none endorsed strong government regulation. ■

BRIEFS

Microsoft to Sell Inside Radio Shack

Microsoft Corp. and Fort Worth, Texas-based Tandy Corp.'s Radio Shack will set up miniature Microsoft stores inside the retailer's 7,000 outlets late next year. The goal is to promote the Microsoft Network (MSN) and other Microsoft products. The exclusive deal is being funded by Microsoft, and Radio Shack will get a cut of sales and ongoing revenue from MSN subscribers. As part of the agreement, Radio Shack will be a major advertiser on Microsoft's online service.

Supercomputing In the Enterprise

According to the latest Top 500 List of Supercomputers, installations of high-performance systems in com-

mercial sites have grown significantly. The list, released this week, identifies just under half the supercomputing sites — 246 out of 500 — as running commercial applications. The same list shows that IBM has taken the trip spot among supercomputer vendors.

Qualcomm Demos High-Speed Wireless

Qualcomm Inc. in San Diego last week showed off its new High Data Rate (HDR) technology and said it is compatible with the IS-95 Code Division Multiple Access (CDMA) specification. It's also compatible with the digital wireless voice transmission standard established by the CDMA Development Group (www.cdg.org), a wireless-industry consortium. The company said HDR will enable wireless providers to leverage the existing cellular infrastructure as the technology can transmit wireless data at up to 2.4M bit/sec. by late next year.

Senate Considers Cybersquatter Bill

Companies angry at so-called cybersquatters who grab Web site addresses with the companies' names or trademarks may get help from Congress. The Senate has taken up a bill approved by the House of Representatives that makes it easier to successfully sue individuals or organizations that register trademarked names with an Internet registrar.

Wireless, Linux-Based Thin Clients on Tap

Windows-based terminal and thin-client developer Maxspeed Corp. and Linux software developer LinuxOne Inc. are working to develop the first wireless, Linux-based thin-client terminals. Mountain View, Calif.-based LinuxOne said it will help Palo Alto-based Maxspeed embed this wireless communications technology in upcoming terminals.

Red Hat to Rev Up Linux

Research Triangle Park, N.C.-based Red Hat Software Inc. said it would produce a new version of Linux with clustering and high-availability features users say are crucial for high-end computing. Red Hat said it will add a journaling file system, larger memory and file system capacities and support for Intel Corp.'s 64-bit processors. These changes will be made public under the Linux General Public License.

IBM Woos Software Vendors

IBM last week announced plans to expand partnerships with independent software vendors. The firm said it wants to shed its reputation for favoring internally built software and tools rather than products developed by others. IBM plans to extend sales and marketing resources to vendors through its Partnerworld for Developers program.

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Continued from page 1

Microsoft Trial

In seeking interim action, the government could, for instance, attempt to block the release of Windows 2000, which is due Feb. 17, on the grounds, for instance, that Microsoft illegally tied its browser to its operating system, said Hillard Sterling, an attorney at Gordon & Glickson PC in Chicago.

But any such move for interim relief "will quash any small hope at settlement," he said.

"We haven't formally requested any interim relief or specific responses from the court on Microsoft," said Connecticut Attorney General Richard Blumenthal, whose state is one of 19 suing Microsoft. But Blumenthal said he hopes Microsoft will move now to correct its abuses.

"The judge's findings are a pretty clear road map as to what its past monopolistic practices have been, and even without a court order, Microsoft can still do the right thing and correct its practices going forward," Blumenthal said.

In his findings released Nov. 5, Jackson said Microsoft is a monopoly that can charge whatever price it wants for Windows without fear of competition. Being a monopoly isn't a crime. But in his verdict, Jackson will decide whether Microsoft used anticompetitive practices to build and maintain that monopoly. His findings, which accept the government's argument on almost every key fact in the case, point to a verdict against Microsoft.

Microsoft Chairman and CEO Bill Gates told shareholders last week that the company is "willing to go a long way to address the government's concerns."

But later, sounding more defiant, he listed numerous conditions that made a settlement seem unlikely. The states are expected to seek a breakup of Microsoft, but Gates has given no indication that he will capitulate on that point.

Blocking the release of Windows 2000 would affect some, but not all, users.

Joseph Mahoney, a technology manager at lightbulb manufacturer Osram Sylvania Inc. in Danvers, Mass., said he plans to use Windows 2000, but not



CONNECTICUT ATTORNEY GENERAL Richard Blumenthal (shown with U.S. Attorney General Janet Reno) hopes Microsoft will move to correct its abuses

for two years. "We're not going to be the first kids on the block to do this. We're going to wait and see how it rolls out."

In the wake of the judge's strong findings, legal experts can see reasons for both sides to settle.

The judge's findings may make it difficult for Microsoft to win an appeal. "I think it's going to be difficult for the court of appeals to overturn some of the core findings be-

cause they are so amply documented," said John Flynn, a professor at the University of Utah College of Law and a former antitrust adviser to the U.S. Senate Judiciary Committee. "I would be thinking settlement."

Meanwhile, the U.S. Department of Justice may want to settle while it's on top, said John Stuart Smith, an antitrust lawyer at Nixon Peabody LLP in Washington. Considering that a previous Justice Depart-

ment victory against Microsoft was overturned on appeal, the government will want to avoid another appeal, he said. "The government's incentive is that the case will never be any better than it is now," Smith said.

But some doubt any settlement will happen.

"I don't think anything is going to happen for years," said Walt Christensen, information systems manager at Ingersoll-Rand Corp. in Farmington Hills, Mich. ▀

Virus Threatens NT File System

BY ANN HARRISON

A computer virus that uses a new strategy to attack the Windows NT file security system and potentially expose it to intruders recently spread swiftly through a U.S. corporation, which reported it to an anti-virus software vendor Nov. 9.

Charles Renert, director of research at the Symantec Anti-Virus Research Center in Santa Monica, Calif., said the virus, known as FunLove, originated in Europe. It invaded the un-

named company when a systems administrator opened an infected file.

FunLove replicates on Windows 95 and Windows NT systems and infects applications that have the .exe, scr or .ocx extension.

Renert said infected users should remove the file fclss.exe from the machine's task manager. He said Symantec has created a tool for performing this procedure that is available at www.sarc.com.

Key Issues in Microsoft Antitrust Case in the Wake of Judge Jackson's Findings

QUESTION	JUDGE JACKSON'S FINDINGS	MICROSOFT'S ARGUMENTS
Is Microsoft a monopoly?	Jackson doesn't believe the Mac OS, Linux, information appliances or Java will truly compete with Windows any time soon. Alternatives such as network computers may one day challenge Windows, but they're hindered by a dearth of third-party applications. This so-called applications barrier to entry was illustrated by IBM's inability to get independent software vendors to support OS/2.	Microsoft contended it isn't a monopoly. It can control software development in the same way Standard Oil once controlled oil distribution. It also doesn't have a monopoly on the brainpower or financial resources needed to produce software.
Are users paying more than they should for Windows?	The absence of competition gave Microsoft substantial discretion in setting prices for Windows. A Microsoft study in November 1997 found that the company could have charged \$49 for an upgrade to Windows 98 but instead charged \$89. Microsoft also had the option of charging PC makers different prices for Windows, forcing higher prices on vendors that resisted Microsoft's efforts to enlist them... to preserve the applications barrier.	When improvements to Windows are considered, the price of its operating system actually declined. It said its operating system competitively priced compared with alternatives. It defended its pricing deals with PC makers as normal marketing agreements.
Did Microsoft use its power to crush Netscape?	Jackson said in his findings that Microsoft's withholding of technical information has been an issue for competitors. If Jackson finds Microsoft guilty of anticompetitive practices in his verdict, Microsoft's actions concerning Netscape are certain to figure prominently. The government has accused Microsoft of proposing a market division to Netscape in June 1995. Under this plan, Microsoft would have left Netscape alone to develop browsers for Macintosh, Unix and 16-bit Windows operating systems, while it would control the 32-bit Windows 95 market. Netscape refused, and Microsoft withheld crucial technical information from Netscape, forcing the company to delay its release of a Windows 95-compatible browser.	Denied any attempt to divide the market with Netscape and has accused Netscape officials of fabricating reports of that meeting. It cites America Online Inc.'s \$10 billion acquisition of Netscape last year as proof of Netscape's continuing viability.
Did Microsoft violate the law by integrating Internet Explorer with Windows?	Jackson set the stage for a guilty ruling in his findings by saying no consumer benefit could be ascribed to Microsoft's refusal to offer a version of Windows 95 or Windows 98 without Internet Explorer. He called some of the company's arguments specious. Jackson may conclude that Microsoft illegally tied its browser to its operating system to hurt competitors.	Integration of Internet Explorer was a step forward in innovation, says Microsoft. It has refused to consider separating its browser from the operating system.
Did Microsoft "pollute" Java?	Jackson agrees with Microsoft that the changes it made to Sun Microsystems Inc.'s Java improved its speed and made it slightly easier to use. But he argues that Microsoft's goal in creating a Windows-specific version of Java was to create incompatibility with Sun's Java implementation.	According to Microsoft, changes to Java improved its operation on Windows. It argued that Sun had rebuffed its efforts to work cooperatively on Java.

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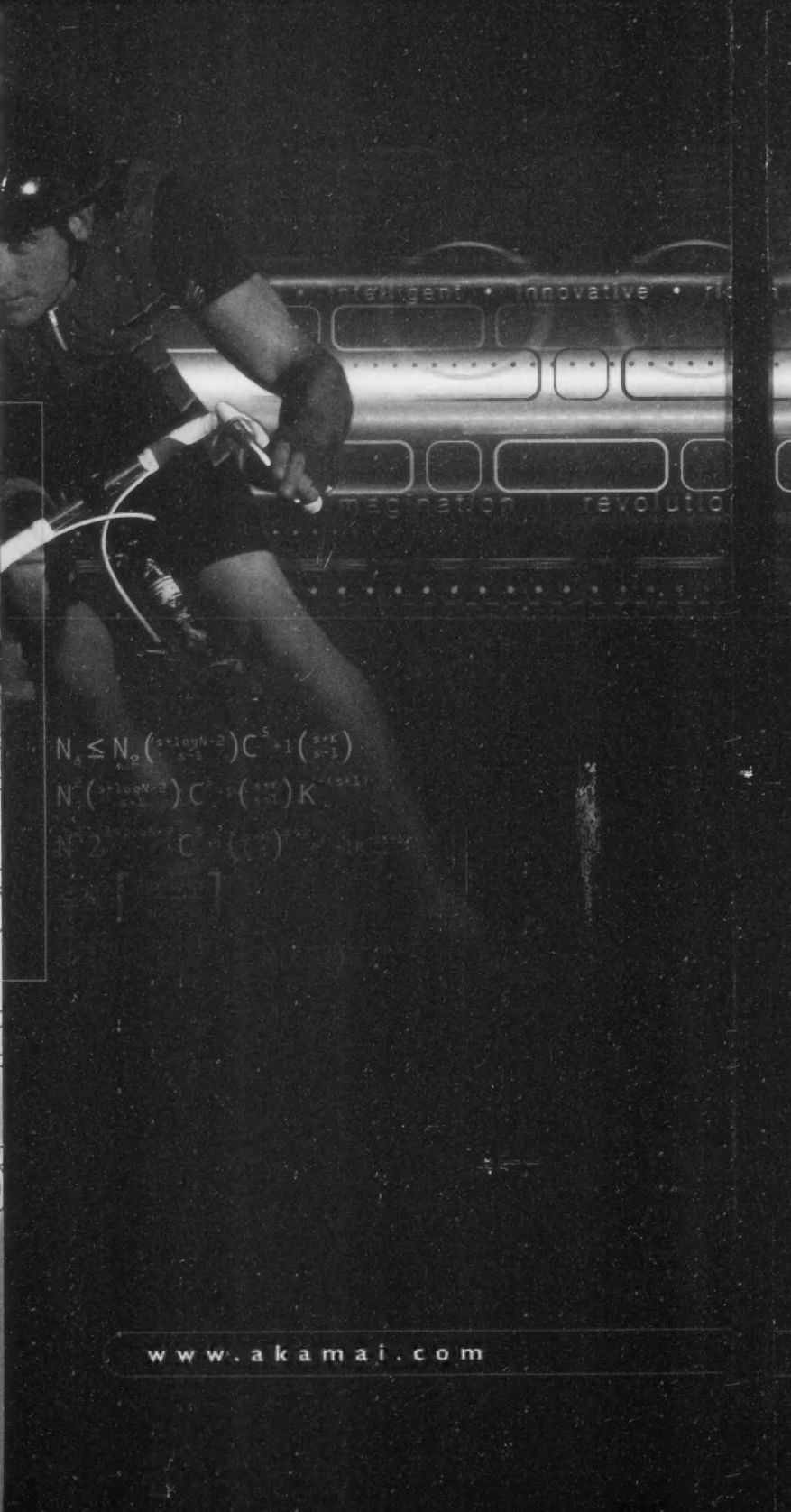
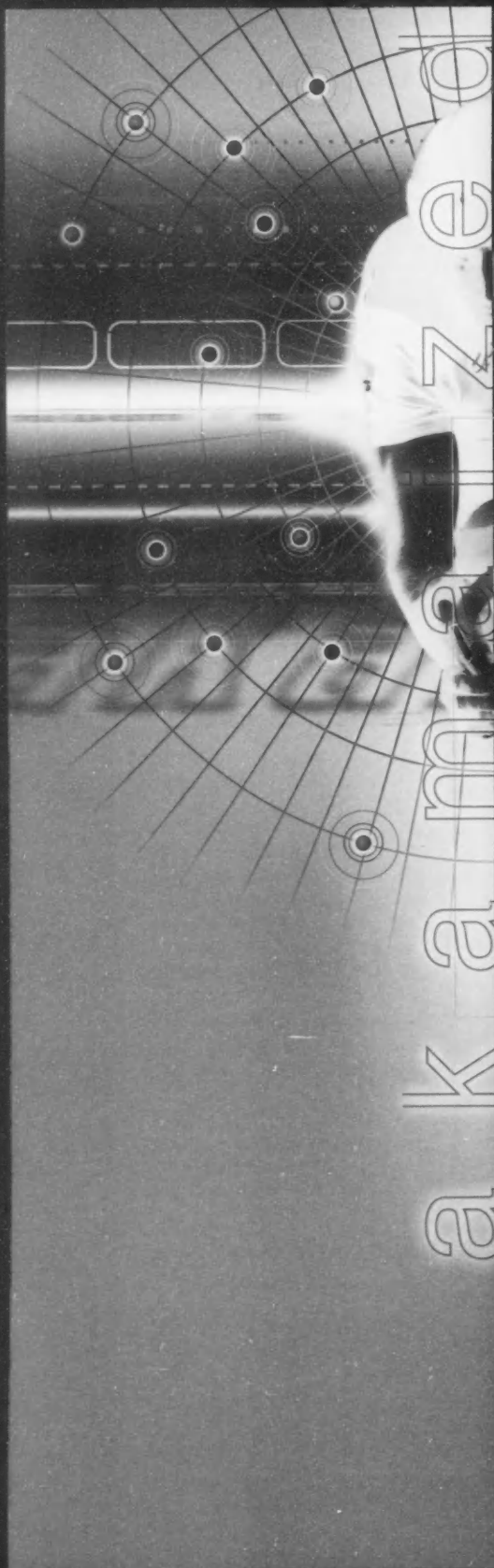
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$$N \left(\frac{s \log N - 2}{s-1} \right) C^{s-1} \left(\frac{s+K}{s-1} \right) K^{-(s+1)}$$

$$N^2 \left(\frac{s \log N - 2}{s-1} \right) C^{s-1} \left(\frac{s+K}{s-1} \right) K^{-(s+1)}$$

$$= N \left[\frac{s \log N - 2}{s-1} \right]$$

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Delivering a Better Internet

RealNetworks Slapped With Privacy Lawsuits

Relief sought by users of music software

BY ANN HARRISON

A SECOND CLASS-action lawsuit has been filed against RealNetworks Inc. for allegedly violating the privacy of online music enthusiasts.

The complaint, filed by the Philadelphia law firm of Sheller, Ludwig & Bady in the Federal District Court for the Eastern District of Pennsylvania, represents four licensed RealNetworks users. The suit,

which seeks unspecified monetary damages, accuses the company of violating the federal Computer Fraud and Abuse Act and state consumer protection and privacy statutes.

"This action is being filed on behalf of the millions of users of the RealJukebox software to obtain compensation and other relief for violations of state and federal law," said Jonathan Shub, a plaintiff's attorney, in a statement last week.

Another user has filed a

A Real Privacy Matter

DATE	EVENT
Oct. 31	Independent security consultant Richard Smith reports privacy breach in RealJukebox product
Nov. 1	RealNetworks issues a patch for RealJukebox, alters its privacy policy and ships beta of RealPlayer 7, which it says doesn't compromise user privacy
Nov. 10	Smith says he's concerned about add-on products that may use a user ID as RealNetworks did

\$500 million class-action lawsuit against RealNetworks.

Thomas Frank, chief operating officer at RealNetworks,

said the company's swift actions of issuing a patch for RealJukebox, offering a new version of RealPlayer and changing its privacy policy demonstrates its concern with user privacy. "We believe all the litigation is completely meritless," said Frank.

A security consultant revealed last month that the

RealJukebox software sent information about customers' listening habits back to RealNetworks without alerting users. The consultant, Richard Smith, charged that the company's RealPlayer product also collected user information.

RealNetworks recently posted a new version of its player, RealPlayer 7, which it says doesn't report personal data.

RealJukebox, which plays and organizes music from CDs and Web sites, has 13.5 million registered users. Users are asked to submit their names and e-mail addresses when they first download the product.

RealNetworks has issued a patch that it said will disable the data collection functions. It also altered the privacy statement on its Web site to reflect the practice. It insisted that the data was meant to provide statistics on the aggregated use of RealJukebox, not data on individual users.

Smith said he remains concerned about third parties creating add-on products to RealNetwork's RealServer product that could also collect data. ▀

SAP Goes to the Front Office

CRM applications due in December

BY CRAIG STEEDMAN
WALTHAM, MASS.

After a long series of fits and starts, SAP AG plans to finally start releasing a new line of sales, service and marketing software next month.

SAP last week said an initial group of five customer relationship management (CRM) applications are due in mid-December. The list includes software for automating field sales and service operations, plus a call center management

system and packages for selling products online and letting customers check the status of orders via the Web.

SAP has let rivals like Siebel Systems Inc. in San Mateo, Calif., and Oracle Corp. get ahead in delivering CRM technology. SAP executives repeated earlier statements that the full i6-product suite they have in mind won't be finished until late 2000 [Technology, Sept. 27].

But at a press conference, users who plan to adopt the new software said none of that matters if they can avoid the need to integrate CRM applications from other vendors with SAP's R/3 enterprise re-

source planning system.

Dow Corning Corp. in Midland, Mich., is using sales force automation software from another vendor, identified by sources as Siebel, in a limited installation. But CIO Harry Ludgate said the silicon products maker plans to switch to SAP's application when a rollout to its full 2,500-employee sales force starts late next year.

Dow Corning made the first choice while it was "waiting to see enough evidence from SAP that it would develop a competitive product," Ludgate said. "Before, it wasn't guaranteed that that was going to come to pass. Now, I think there's abundant evidence it will."

New York-based Colgate-Palmolive Corp. is helping SAP design one of the upcoming CRM applications: a module that lets manufacturers work with retailers to jointly plan product promotions. Colgate-Palmolive CIO Ed Toben said he expects that package to be ready for initial use in the consumer products company's U.S. operations by next spring.

Toben's plan is to tie that product with R/3 and SAP's data warehousing and supply-chain planning applications so data can flow between them in a loop of planning, execution and analysis. The company is also mulling installing SAP's sales force automation software, but not until it upgrades to a new R/3 release next fall. ▀

Nortel Bets on IP Software

BY JAMES COPE

In a move that one analyst described as "a major assault" on Cisco Systems Inc., Nortel Networks announced in New York last week its Open IP Environment Software, which is aimed at standardizing Internet routing and placing more routing functions on the access points to the network rather than the core router.

Nortel said the approach will enable embedding of router functions in network and client appliances, speed IP traffic by doing more routing at the edge of the network and lower costs by routing at the access switch. That will reduce the need for more expensive router hardware.

To drive home the point, Brampton, Ontario-based Nortel also announced that it would cut prices by 50% on its access data routers, including the Bay Router AN and ARN.

"Using software solutions instead of hardware makes it easier to upgrade [router functions]," said Brownlee Thomas, an analyst at Giga Information

Group Inc. in Cambridge, Mass. "This represents a window of opportunity for Nortel that's ahead of the competition."

Another Giga analyst, Stan Schatt, noted, "It's one thing to announce a new paradigm; it's another thing to see it deployed. A lot of [Internet service providers] are locked into Cisco's protocol."

Similarly, users who have already installed and paid for their routers aren't about to chuck them in favor of an emerging technology, said Schatt. He suggested it would probably take two or three years for Nortel's technology to hit the mainstream.

"Don't expect that lower prices will set off a stampede," Schatt said.

A Nortel spokesperson said the company has received licensing commitments from Microsoft Corp. and Intel Corp. Microsoft confirmed that it had licensed Open Shortest Path First, one of the routing protocols in Open IP, and would include it in Windows 2000. ▀

SAP Web Access to Come Via HTML


SAP is still developing a Java-based user interface. But don't expect to see it on a Web browser any time soon.

For users who want to access R/3 and the company's other applications via the Web, SAP is sticking with a simpler user interface written in the Internet programming language HTML. It all comes down to speed, said Hansjo Plattner, SAP's co-chairman.

HTML "clearly beats every other concept" on the Web in performance, since no code has to be

downloaded to an end user's browser, Plattner said. "It's much faster than Java, and that's a huge advantage," he said.

The Java-based user interface should be ready next year as a multipatform desktop alternative to SAP's Windows client software, Plattner said. It may even fully replace the Windows-only product, although Plattner said that hinges on talks between SAP and Microsoft Corp. "We don't want to imitate [Microsoft]," he added.



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As our readers' thoughts turn to Windows 2000 so, too, do we. Our webzine is now Windows 2000 Advantage (formerly Windows NT Advantage). And to keep pace with our reader community, we're offering a full slate of case studies, feature stories, Q&As with top Compaq and Microsoft executives, user perspectives, Windows 2000 analyses from our columnists and "Closer Looks" that focus on installation and migration issues.

Online This Week

Know the Ins and Outs of Using Active Directory Service

Microsoft's Active Directory Service offers multiple new features that make network administrators, software developers and software vendors more efficient. New technology features present obvious benefits to end users, but along with the benefits come challenges.

PC Certification Tests Offer Peace of Mind to Users

Compaq's PC Certification Testing Service lets Hamburg Mannheimer, one of the largest life and accident insurance firms in Germany, test its mission-critical software on Compaq PCs without burdening its IT department.

Dateline: Windows 2000

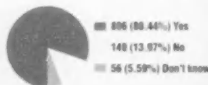
Users who formulate a thoughtful migration plan and implement it wisely stand to benefit mightily from Windows 2000. Those who migrate with haste will end up with waste, says Windows 2000 Advantage columnist Laura DiDio.

Quickpoll Will Windows 2000 play an essential role in your company's success?

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Check out last month's results: Will you be seriously investigating a Windows 2000 implementation within the next 24 months?
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Windows 2000



Quest for Reliability Drives Windows 2000 Build Labs

Microsoft team cranks out one new "build" after another

By Bruce Hoard

Seemingly obsessed with developing the highest possible reliability for Windows 2000, Microsoft test manager Arden White, his colleagues and their predecessors in the Windows 2000 Build Labs have been cranking out a new version — or "build" — of Windows NT or Windows 2000 five days a week, 52 weeks a year since late 1989. As of Oct. 14, they were up to 2,151 and counting.

That's what you call dedication.

White exemplifies that dedication. He typically has the latest Windows 2000 build running on all three of his computers, including the laptop he takes everywhere. It seems he and the other team members never tire of taking input from the approximately 1,000 Windows 2000 developers and using it to improve their product.

"We've raised the bar on reliability and robustness," White declares. "It's really nice to see how things have come together and been integrated so well."

Three teams, seven languages and a lot of Compaq servers

The Windows 2000 Build Labs are composed of three groups and some 36 people. The Build Team, to which White belongs, integrates developer changes into the product. Its goal is not to find every bug, but to integrate changes and pass the latest version to the Build Verification Test (BVT) team.

When BVT tests are passed successfully, the build is released to approximately 3,000 people inside Microsoft on a daily basis.

The third Build Labs group works with international audiences, producing weekly builds of Windows 2000 in seven languages: German, Japanese, Korean, simplified Chinese, traditional Chinese, Arabic and Hebrew. Also, there are 19 more languages produced in Ireland.

In addition to the three teams, other lab members perform special engineering projects and produce service pack patch-

es, which can be downloaded from the Microsoft Web site.

Although most Windows 2000 developers are Microsoft employees, a few outside customers, such as Compaq, are also contributing. According to White, Compaq has supplied device drivers for the operating system and participated in a joint development project. White worked with Brent Harman, Compaq's program manager for Windows 2000, on that project.

"Compaq has certainly been more involved with Windows 2000 than most OEMs," White notes.

He estimates that the labs are running the latest Windows 2000 builds on a range of 25 to 30 Compaq servers — including the just-introduced eight-way ProLiant system — with access to some 5T bytes of server disk space.

For more on the Build Labs, visit www.Windows2000Advantage.com.

ADVANTAGE

► ROUNDTABLE

Top Users Sound Off On Win 2000

Compaq hosts users at Windows 2000 Academy

As part of its extensive campaign to familiarize users with Windows 2000, Compaq recently sponsored the Windows 2000 Academy in San Diego. There the company gathered top technical representatives from over 100 of its largest customers for an intensive, five-day course dedicated to the emerging operating system, which is now due to ship Feb. 17, 2000.

The Academy's multinational faculty of instructors was composed of Compaq's "Dream Team" of Windows 2000 experts drawn from the company's Professional Services Division. Organized by Windows 2000 guru Tony Redmond, who is Compaq's director of the Microsoft Applied

Technology Group, this group is also scheduled to conduct a similar Windows 2000 Academy in Cannes, France, the week of Nov. 22.

Attendees were treated to presentations, demonstrations and overviews on Windows 2000 features, including Active Directory, security basics, management tools, Domain Naming Services and Group Policy Objects. After the overviews, they attended a series of hands-on labs that brought the demonstrations into a real-life focus.

Windows 2000 Advantage invited four attendees at the event to take part in a roundtable designed to elicit from the trenches opinions on a range of Windows 2000 topics. In the course of the discussion, which was moderated by Windows 2000 Advantage staff reporter Stefanie McCann, these high-level users expressed their concerns with migration and their overall support for Windows 2000.

The main topics discussed during the roundtable included the attendees' overwhelming satisfaction with their experiences at the Academy. They also told Windows 2000 Advantage that they expect rolling out Windows 2000 won't be as easy as they had thought; they'll need to go back to their organizations and start mandating some cultural changes.

Read more about how these four customers plan to do that along with their thoughts on Active Directory, security, Domain Naming Service and their own scheduled migration plans. Visit www.Windows2000Advantage.com.



◀ Kevin Hookway (left), a systems consultant at BankBoston, gets one-on-one tutoring from a Compaq lab assistant at the Windows 2000 Academy

www.Windows2000Advantage.com

Point of View

Compaq PCs are Windows 2000 READY now

Even though Windows 2000 hasn't yet been officially introduced, it has been thoroughly beta-tested by many users, and PC vendors are in the process of making their products Windows 2000 READY. The vendors that do provide true value to their customers who are purchasing new PCs today.

Windows 2000 READY, as formally defined by Microsoft a year ago, requires that a machine run Windows NT 4.0, have at least 64M bytes of RAM and a 300-MHz class or higher Pentium processor for a desktop and 233-MHz or higher for a notebook.

In addition, PCs have to qualify for the Windows 2000 logo: "It means they've gone through a battery of tests to ensure stability, compatibility with Windows and with industry standard peripherals," says Steve Stanzel, a Windows 2000 product manager at Microsoft. "It's a good measure of quality."

PCs need to have a ROM BIOS that supports Advanced Configuration and Power Interface, an industry power management standard that enables an operating system to manage

the power state of a PC and its attached devices.

"If a PC is Windows 2000 READY, you know it's been tested to upgrade easily to Windows 2000 Professional, the hardware and software works, it's a one-step process," says Stanzel.

Last August, Compaq — which has worked closely with Microsoft on Windows 2000 development and was among the earliest hardware vendors to have Windows 2000 READY PCs — announced a free license upgrade program from Windows NT 4.0 to Microsoft's Windows 2000. The program includes all Compaq PCs purchased between June 15, 1999, and March 31, 2000 that meet Microsoft's specifications for a "Windows 2000 READY PC."

All Compaq Deskpro PCs shipping with Windows NT 4.0 and 64M bytes of memory are certified as being Windows 2000 READY. In addition, most currently shipping Armada portable PCs and select models of professional workstations now shipping are also Windows 2000 READY.

To read more, visit www.Windows2000Advantage.com.

For more inside, hands-on Windows 2000 information, go to www.Windows2000Advantage.com

GO

Airlines Team Up To Build Joint Site

United, Delta, others seek to compete with Expedia, Travelocity in busy market

BY LINDA ROSENCRANCE

FOUR MAJOR airlines said last week they would launch a travel Web site to compete directly with online powerhouses Travelocity and Expedia Inc.

United Air Lines Inc. in Chicago, Delta Air Lines Inc. in Atlanta, Northwest Airlines Inc. in Minneapolis and Continental Airlines Inc. in Houston said they would retain their own Web sites and hire Boston Consulting Group Inc. to build and manage the joint travel

portal site in the first half of next year. Through the new site, the carriers will provide customers with online access to airline, hotel, car rental and other travel services.

Newly Aggressive

Airlines haven't traditionally been aggressive on the Internet, choosing instead to let a large part of the market share be sold through Internet travel companies, according to Jupiter Communications Inc. in New York.

But that's about to change,

because the airlines want to tap in to the ever-growing and lucrative market of online travel. Jupiter projects the market will grow from \$4 billion at the end of this year to \$17 billion by the end of 2003 (see chart).

"This is a great, aggressive move on the part of the airlines," said Melissa Shore, a Jupiter analyst.

Typically, airlines have only been able to attract very loyal customers to their sites, Shore said. This move will let them bring price-conscious consumers into the fold.

But how effectively the airlines provide those services could be key to the success, or failure, of the new site.

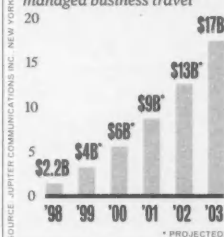
"In order to get a leg up in

the industry, the airlines may decide to acquire an already existing online travel company, one that already has the sophisticated tools and features but can't compete with the major players. They don't need to reinvent the wheel," said Krista Pappas, an analyst at Gomez Advisors in Lincoln, Mass.

Kurt Ebenhoch, a United spokesman, said the airlines group has no plans to acquire any travel Web site. Boston Consulting "has a proven track record in creating multiparty Web sites," he said. ■

Online Travel

U.S. market for leisure and unmanaged business travel



New Niche: Finding Experts

Software sifts e-mail files to find who's in the know

BY DOMINIQUE DECKMANN

Whatever your question, in a multinational enterprise with tens of thousands of workers, someone is likely to know the answer. The problem is: Who?

Traditionally, knowledge management has focused on locating documents. But increasingly, companies are discovering that it's more valuable to link people with one another. Many are setting up corporate yellow pages that list each worker's expertise.

Now a number of vendors are developing software to help automate this process.

Often, such software uses sophisticated analysis techniques to sift through documents a worker produces and e-mail he sends to create an up-to-date, dynamic profile.

"It's good to find written documents [on a subject], but I'd rather find the person," said Shereen Remez, chief knowledge officer at the General Services Administration (GSA), a federal agency with a \$14 billion annual budget.

The concept is finding favor with users. At New York-based Schlumberger Ltd., some engineers in Norway were working on an antenna to send seismic data from automated measuring equipment deployed in swamps. Another group in Tallahassee, Fla., was looking for an antenna to read data from underground water meters.

The company's corporate directory helped both groups find out about each other and save Schlumberger a tidy sum of money, said Bill MacGregor, manager of IT crafts.

John Old, focus area leader for knowledge management at Texaco Inc. in White Plains, N.Y., is piloting software from Palo Alto, Calif., start-up Tacit Knowledge Systems.

The KnowledgeMail product scans through an employee's e-mail to update the employee's profile. The e-mails themselves aren't stored by the system, and workers can still decide to keep certain information about their expertise and interests private.

"[The software's] power grows exponentially with the number of people you connect," said Old. "If you think of the e-mail that flies around in a company of 20,000 or 30,000 employees, there has to be a lot of information in there."

Remez said, "People are losing all the tacit knowledge that gets sent over e-mail."

At the GSA, employees already have a Web page that lists their expertise, Remez said. But it relies on employees to take the time to update their profiles — and do so accurately. Remez said she's extremely interested in technology like Tacit's, which could keep such profiles updated.

KnowledgeMail, launched earlier this month, runs on a Java server and works with Lotus Notes, Microsoft Exchange and any e-mail system that supports Internet Mail Access Protocol 4. It's priced at about \$400 per user. ■

Research Firm: Browser Competition Over

Netscape a distant second to Microsoft

BY STACY COLLETT

Internet competition is over, and Microsoft Corp. is the winner, with Netscape Communications Corp. a distant second, Zona Research Inc. declared last week. The Redwood City, Calif., research firm has issued its final browser study and said it will no longer follow browser competition.

"Shelves that were filled with ... competing brands have ... given way to the reality of a Coke- and Pepsi-dominated marketplace," said Clay Ryder, vice president and chief analyst at Zona.

When Zona first studied the browser market in January 1996, there were nine players battling for a slice of a \$200 million market. Brands included Quarterdeck Corp.'s Mosaic, Wollongong Group Inc.'s Emissary and NCD Software Corp.'s Mariner. Today, Microsoft and Netscape are dominant players for a zero-dollar market, officials said.

In the final study of 236 re-

spondents, Microsoft's Internet Explorer was the primary browser choice for 64% of respondents, compared with 36% for Navigator.

Other research firms are scaling back or eliminating browser coverage.

The Fat Lady Has Sung

"It's over. The fat lady has sung," said Kathy Hale, principal analyst in the e-business group at Dataquest in San Jose.

Dataquest quit covering browsers after America Online Inc. bought Netscape earlier this year, said Hale.

In testimony during Microsoft's antitrust trial, "AOL Chairman" Steve Case said he bought Netscape 'despite' the

browser. And his actions are living out what he said. So now the issue really is one [browser]," she said.

Zona said one reason for the fallout is many companies have adopted browser policies. Some 73% of companies have a policy requiring all departments to use the same browser. Of those, 69% use Explorer and 31% use Navigator.

Since July 1998, no other browser has been named as part of a corporate browser policy, the study said.

Giga Information Group Inc. in Cambridge, Mass., offers limited coverage of the browser market.

Joel Yaffe, an analyst at Giga, said conservative organizations stuck with Netscape because they had invested time and money adding customized features. Today, "even if they want the [Navigator] standard, there's Internet Explorer because it's bundled [with other software]," he said.

Yaffe added that with Netscape now 19 months behind on a new version of Navigator, "it's becoming less and less defensible to select Netscape." ■

Browser Shift		
	EXPLORER USERS	NAVIGATOR USERS
January 1996	2%	71%
September 1997	36%	62%
October 1998	40%	60%
October 1999	64%	36%

SOURCE: ZONA RESEARCH INC., REDWOOD CITY, CALIF.

Global Finance September 1999

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Hospital Inks \$228M Outsourcing Agreement

Staffing issues, focus on medicine fuel industry trend

BY JULEKHA DASH

NEW YORK Presbyterian Hospital last week said it will pay \$228 million to outsource its information technology department for seven years. The agreement with First Consulting Group Inc. (FCG) in Long Beach, Calif., launches FCG Management Services LLC, a new unit of which the hospital will own 15%.

Industry observers said the deal marks a trend among large health care providers. Many are deciding to outsource their IT departments, largely because of IT staff retention issues. One analyst said several more health

care outsourcing arrangements could be expected in coming months.

Under the hospital's arrangement with FCG, more than 400 members of New York Presbyterian's IT staff will work for FCG Management Services. Eighty unionized IT staff members will remain hospital employees, said Louis Reuter, executive vice president at New York Presbyterian.

FCG will provide IT services not just to New York Presbyterian, but also to the 26 other hospitals, 11 home health agencies and 78 ambulatory care centers that compose the New York Presbyterian Healthcare Network.

Reuter said the deal will enable the

health care provider to have the staffing it needs to complete more sophisticated projects, such as creating a universal index for tracking patient information.

"In a nonprofit health environment, we couldn't keep the best information technology people," said Reuter. In the past, anywhere between 10% and 15% of his organization's IT positions have been vacant, he said.

According to a survey conducted by

Meta Group Inc. in Stamford, Conn., salaries for health care IT professionals ranked last among nine industries — even behind government. On average, IT professionals in the health care industry made 40% less than those working in the top industries, said Mark Anderson, a vice president at Meta and a former hospital CIO.

A growing number of health care providers are deciding to outsource IT because it's not among their core competencies, Anderson said.

A handful of providers have entered outsourcing agreements worth more than \$200 million. In August, CareTech Solutions Inc. in Farmington Hills, Mich., announced a 10-year, \$1 billion outsourcing agreement with Detroit Medical Center. ■

CIOs Cite Pros, Cons of Medical Regs

Proposed privacy rules could hinder critical care

BY JULEKHA DASH

Health care CIOs have differing views on the Clinton administration's recently proposed medical privacy regulations: Either they're a natural step forward or more red tape for an industry that's already heavily regulated.

On Oct. 29, President Clinton proposed regulations that would subject health care providers to fines and jail time if they don't obtain written consent before releasing electronic patient information to third parties. The regulations wouldn't include payment information or data transfers that are in a patient's or the public's health interest. A final version of the rules is expected next month.

Considering the penalties, information technology departments will need to provide adequate measures to ensure medical data is protected.

For example, Jim Klein, an analyst at Stamford, Conn.-based Gartner Group Inc., said the rules will require a more comprehensive audit trail to show which staff members have accessed an electronic medical record.

"For quite some time, health care has been working on policies for safeguarding medical information," said Hal Scott, CIO at the University of Virginia Health System in Charlottesville, Va.

A review board at the health care system determines which staff members can access the password-protected records. "None of us want to have this information disclosed in an unauthorized manner," Scott said.

But Robert Gerick, CIO at LaPorte Regional Health System in LaPorte, Ind., responded less enthusiastically to the proposal. As an individual, he said,

he sympathizes with patients' rights. But as someone responsible for medical records, Gerick said he is concerned that the regulations could mean that eventually patients will decide who has access to their medical data — which may not be in a patient's best interest if providing access to some caregivers is time consuming or hinders care.

For instance, consulting physicians may not be able to quickly access files if they aren't preauthorized.

"A government system trying to regulate [patients' rights] will inherently [have] problems — either in [its] vagueness or shortsightedness," he said.

Gerick said he's looking into merging information from LaPorte's disparate clinical systems into a database. He said he's considering using biometric authentication — such as a fingerprint or iris scan — to restrict access to records.

LaPorte already uses a fingerprint-imaging system from NEC Technologies Inc. in Arlington, Va. ■

JUST THE FACTS

Privacy Proposal

The Health Insurance Portability and Accountability Act includes these components:

- Imposes standards on health care electronic data interchange transactions.
- Creates unique identifiers for patients and providers.
- Imposes stringent rules, with criminal penalties, for data privacy and security.

Notes:

- Final rules will be issued in February.
- Compliance required within 26 months.
- Penalties for improper disclosure: up to \$250,000 or imprisonment of up to 10 years.

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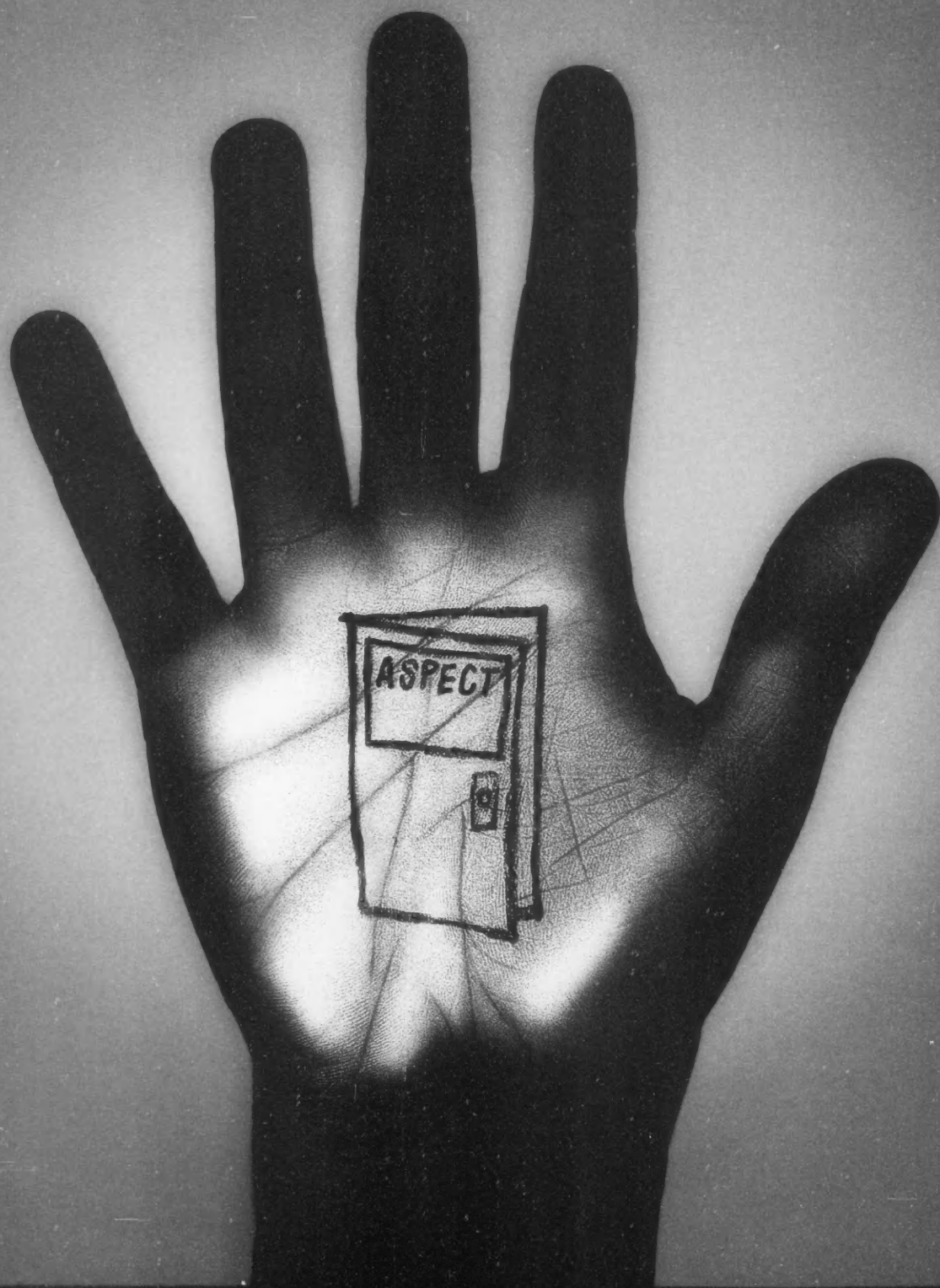
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BRIEFS

BEA Makes Purchase

San Jose-based BEA Systems Inc. last week announced that it will spend \$100 million in stock and cash to acquire The Theory Center, a privately held Boston software development company that makes Enterprise JavaBeans component technology. Reusable, prebuilt Enterprise JavaBeans components can help customers build e-commerce applications more quickly.

C&W Profits Down

Cable & Wireless PLC last week reported a 40% drop in net and operating profits, which it attributed mainly to problems with its Hong Kong subsidiary and the continued expense of building up its network. The London-based telecommunications carrier's net profit sank to \$332.6 million for the first half of its fiscal year ended Sept. 30, down from \$356 million in the first half of last year. Revenue rose 25%.

Alcatel Financials Up

Alcatel SA, the French telecommunications and network equipment maker, last week reported increases in third-quarter income and revenue, which were in line with expectations.

Alcatel showed net revenue of \$5.5 billion for the quarter ended Sept. 30, up 9.4% from a year ago. Net income for the quarter reached 83 million euros, compared with a loss of 9 million euros in the same quarter last year, the company said.

North America represented 21.8% of the company's sales.

GM Invests in Voice Recognition

General Motors Corp.'s OnStar division last week said it plans to invest \$15 million in voice-recognition software maker General Magic Inc. as part of its e-GM initiative to offer Web surfing capabilities in its automobiles.

General Magic in Sunnyvale, Calif., is the developer of magicTalk, which GM will use as its voice interface for the OnStar Virtual Advisor. Although the Virtual Advisor is a Web-based system, drivers will receive their information audibly through car radios.

Cisco Sales Up; Buying Spree Tempers Profits

As Q1 sales show 50% growth, networking company announces two more purchases

BY JAMES COPE

CISCO SYSTEMS Inc. announced last week a nearly 50% increase in first-quarter fiscal 2000 sales, the purchase of wireless network maker Aironet Wireless Communications Inc. and enhancements to its network management suite.

The San Jose internet networking company reported net sales

for the first quarter ended Oct. 30 of nearly \$3.9 billion, compared with \$2.6 billion for the same period last year. However, net income was down to \$438 million, compared with \$512 million for the same period a year earlier, because of acquisitions made in the quarter.

The earnings report followed an announcement by Cisco that it would purchase Aironet in Akron, Ohio, in an all-stock

deal worth \$799 million.

Aironet's products include wireless adapter cards and a wireless bridge product that will enable Cisco to provide wireless LAN connectivity within and among buildings in a campus setting.

The purchase fills a significant gap in Cisco's product line, said Stan Schatt, research director at Giga Information Group Inc. in Cambridge, Mass.

Earlier in the quarter, Cisco acquired Monterey Networks Inc. and MaxComm Technologies Inc. for \$590 million. Other recent acquisitions include StratumOne Communica-

tions Inc., TransMedia Communications Inc. and Cocom A/S.

Cisco made another acquisition move late last week, announcing it would purchase V-Bits Inc. in San Jose for \$128 million in stock. The purchase will give Cisco V-Bit's digital processing systems that are sold to cable TV providers.

Cisco also said it was enhancing the integration of its WAN management tools. The package will include a browser interface for CiscoView, a management tool that displays real-time network device status and operational and configuration functions on a network. ■

SAP Files Suit Against Siebel

Alleges predatory hiring practices

BY JACK MCCARTHY

SAP America Inc. has filed a lawsuit against rival Siebel Systems Inc. alleging that the defections of several of its executives to Siebel were the result of "predatory hiring practices," Siebel said last week.

The suit states that more than 20 employees, including several top executives, have left SAP for Siebel in the past year, Siebel said in a statement.

"Over approximately the last year, Siebel has engaged in a systematic effort to injure SAP's business and impede SAP's ability to compete with Siebel in the [customer relationship management] marketplace," the lawsuit alleges, according to Siebel's statement.

Hasso Plattner, SAP's co-chairman, said the company is fighting back after Siebel "declared war on us." He claimed that Siebel has given stock options worth up to \$200 million to former SAP executives and that European shareholders wouldn't let companies get away with that kind of largesse.

In fact, SAP wanted to start offering stock options to its U.S. employees to keep them from being raided by other vendors.

But a German shareholder "threatened to immediately sue us to death," Plattner said.

In March, SAP announced that Jeremy Coote resigned as SAP America president to become vice president of Siebel's North America operations. Then, in May, Siebel announced that Paul Wahl, a former CEO at SAP America, who briefly became CEO of TriStrata Security Inc., had been appointed Siebel's new president and chief operating officer.

One industry analyst commenting on the SAP lawsuit said executive defections to rival software vendors are commonplace. "You have to believe Siebel enticed these people with some interesting stock considerations," said Tim Bajarin, president of San Jose-based Creative Strategies Inc.

Two years ago, Microsoft Corp. and Borland International Inc. (now Inprise Corp.) clashed over the same issue. Borland sued Microsoft, alleging the software giant had systematically tried to raid its staff to gain a competitive advantage. The suit was settled out of court in 1997. ■

McCarthy writes for the IDG News Service in San Francisco. Computerworld senior editor Craig Stedman contributed to this report.

Cisco's Fortune

It was a good quarter for the internet networking giant:

NET INCOME	Q1 2000	Q1 1999
With acquisition charges	\$438M	\$512M
Without those charges	\$837M	\$561M

CA to Appeal Payback Ruling

BY JACK MCCARTHY

Computer Associates International Inc. said Thursday that it will fight a court ruling that requires three of the software company's top executives to pay back \$550 million in executive compensation.

CA's board of directors will appeal the Nov. 10 ruling by Delaware Chancery Court Vice Chancellor Myron Steele, the company said.

Last week, Steele issued a summary judgment in favor of CA shareholders that called for the executives to return \$550 million of \$1.1 billion in stock that they received in a 1995 package. The ruling came in response to a lawsuit filed last year against the Islandia, N.Y., company charging that the compensation package was excessive.

The executives who received the compensation package are Charles Wang, CA chairman

and CEO; Sanjay Kumar, president and chief operating officer; and Russell Artzt, company co-founder and executive vice president of research and development.

Day-to-day management of CA won't be undermined by the ruling, Wang said in a statement.

CA said the compensation package was intended as a reward for a \$17.4 billion increase in CA's market value and was approved by the board of directors' compensation committee with the overwhelming support of shareholders.

The \$550 million judgment "is a big number, of course," said Fred Taylor Isquith, a lawyer for the plaintiffs. "The board went overboard, and the court recognized they were completely without authority to issue that kind of money." ■

McCarthy writes for the IDG News Service in San Francisco.



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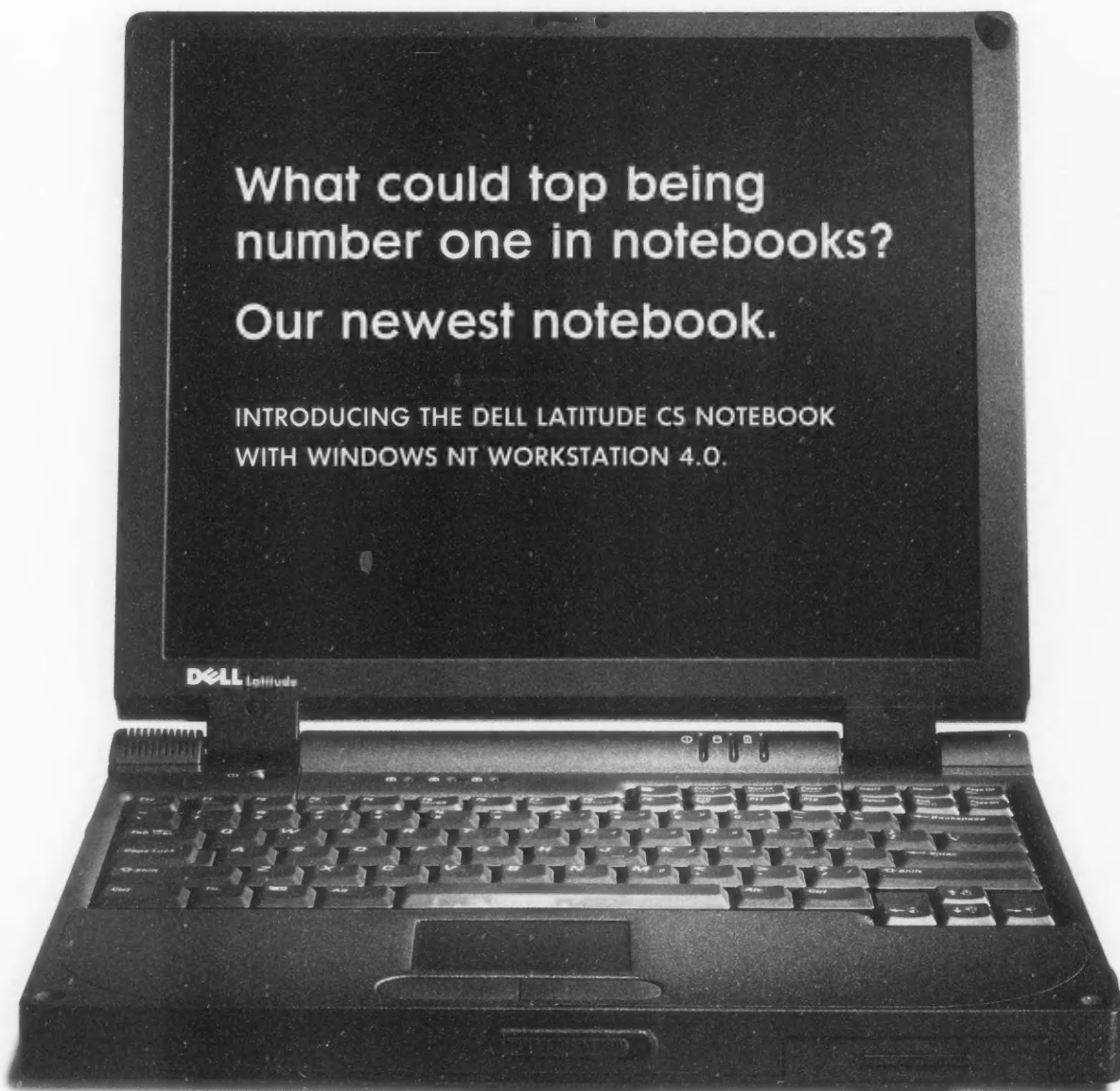
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MARYFRAN JOHNSON

Mired in Microsoft

TALKING ABOUT Microsoft these days is like discussing politics, sex or religion. You're on dangerous ground when it comes to polite conversation. On one end of the spectrum are the zealous Microsoft haters, relishing every critical word written about the antitrust case and obsessing over the next moves by Judge Thomas Penfield Jackson and those legions of lawyers. On the other end are the aggrieved Microsoft lovers, who demonize the government and sneer at the judge's finding that the most successful company in the world got there through misuse of monopoly power.

Milling around in the middle are the rest of us, including the vast majority of IT professionals, most of whom are a lot more worried about pressing issues like the Y2K rollover or e-commerce strategies than the murky future of Microsoft. We surveyed more than 100 IT folks last week (see Page One) to learn what they think of the judge's findings. Their reactions seem to be universal: "Of course it's a monopoly. Well, yes, they should settle, but Bill Gates won't. And no, there's no impact on my job or my business decisions today."

Viewing the case in the long term, with its potentially far-reaching consequences for IT, is much more engaging. So last week, I asked several CIOs and IT executives for their



MARYFRAN JOHNSON is editor in chief of *Computerworld*. You can contact her at maryfran.johnson@computerworld.com.

frank, unvarnished opinions. "Well, you can't be right and you can't be wrong," one of them cheerfully wrote back. "Anything could happen."

"The irony is this may help Microsoft become stronger," said one IT executive at a defense contractor. "It may be the diet and exercise program they need to really last another 50 years."

Among all their varied opinions was the distinct conviction that whatever happens to Microsoft, this is a defining moment.

"At the end of the day, people such as myself are the biggest winners or losers in this dance of death," said the CIO of one global firm. "The monies we will spend in the next 10 to 15 years are in the process of being determined now. With choice, CIOs can provide better and cheaper solutions on a timely basis. With the world according to Microsoft, it will be costly and time-consuming." ■

MICHAEL CUSUMANO

The Microsoft trial: Findings of fact and hard feelings

MICROSOFT OFTEN appears as a bully, and I have felt its power directly. In the fall of 1998, David Yoffie of Harvard University and I fought Microsoft in court — twice. Microsoft subpoenaed the audiotapes and research notes on Netscape that provided the information for our book *Competing on Internet Time*. We refused to turn over to Microsoft any information that Netscape's people hadn't cleared for publication. Microsoft lost, appealed and lost again. Nevertheless, we understood that Microsoft tried so hard to get our materials in the event that there was more evidence useful to its case. We did what we had to do, and Microsoft did what it had to do. No hard feelings.

My concern with Judge Thomas Penfield Jackson's findings of fact is that this document is one-sided and reflects real anger — hard feelings — toward Microsoft.

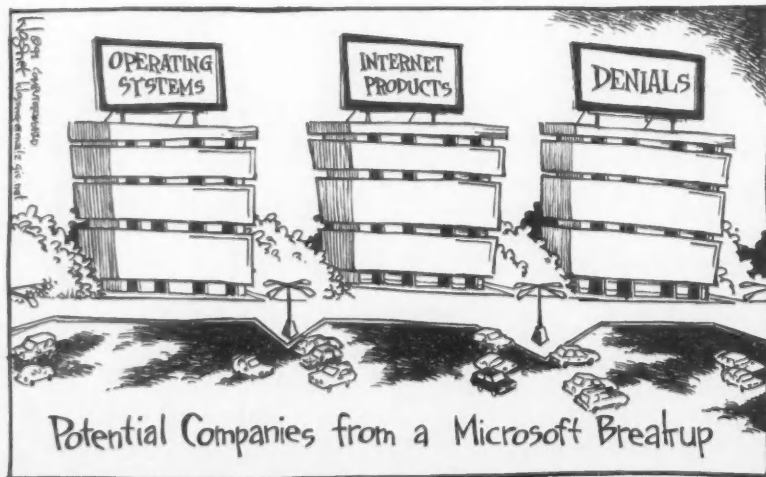
The company is arrogant, and its denials of wrongdoing sometimes sound like old Soviet Tass News Agency briefings. But the main problem is that Microsoft's people haven't understood the rules of the game. It's not illegal to have a monopoly, usually defined as 70% or more of a market. It's illegal only to abuse a monopoly, and therein lies room for misunderstanding.

With 90% of the operating systems business, Microsoft has a monopoly. I also believe that Microsoft has abused its position and that the government must prevent Microsoft from making roadkill out of future Netscapes. But Microsoft's people honestly believe that a monopoly in software is unlike a monopoly in oil or steel, where assets and market shares are more durable.

Some evidence supports this. Netscape appeared almost overnight to challenge Microsoft and then saw its 80% market share collapse. Sun, Netscape, AOL and Linux vendors complain about Microsoft, but they can still quickly distribute from their Web sites millions of copies of products that compete with Windows and may someday supplant it. The judge criticized Microsoft for tying Internet Explorer to Windows instead of treating them as separate products, and he then claimed



MICHAEL CUSUMANO, co-author of *Competing on Internet Time: Lessons from Netscape and Its Battle with Microsoft* and of *Microsoft Secrets*, is a professor at the MIT Sloan School of Management. Contact him at cusumano@mit.edu.



that Microsoft harmed consumers because the free browser made Windows unstable. The judge failed to mention that Netscape Navigator cost money and caused Windows to crash frequently, too.

My point is that definitions of monopoly-power abuse, product boundaries and customer benefits are murky, especially in markets that converge and overlap. Computer hardware and software, like VCRs, gravitate toward a monopoly because consumers find compatibility more useful than innovation. It becomes easy to overstep antitrust laws when dominant standards emerge naturally, when antitrust laws are subject to interpretation and when competitors act aggressively to protect fragile positions. Microsoft should have the right to compete aggressively and define the functionality in its products.

This case is a great opportunity to define how old laws apply to new industries. Unfortunately, Jackson left little room for clarification and negotiation. Windows has satisfied millions of customers, and Microsoft has produced award-winning software, including Internet Explorer. A positive outcome requires cool heads and Microsoft's cooperation in finding a solution. It's time to put hard feelings aside. ■

DAVID MOSCHELLA

A harsh ruling, yes. But Microsoft has only itself to blame

NOW THAT JUDGE JACKSON has told us what he thinks about Microsoft, how do you feel? Are you happy that "the truth" has finally been officially recognized, or are you angry that one of the greatest companies in

American history is being publicly pummeled and dragged through the mud, apparently because it is simply too successful? More likely, your feelings are, like mine, considerably more mixed.

I'm actually surprised that I feel almost no sense of vindication. After all, since the summer of 1996,

I've been regularly writing that, regrettably and unwisely, Microsoft stepped over the line to become a dangerous new predator at-large, the insatiable *Tyrannosaurus Gates*. I must have reiterated at least a dozen times that, because of its longstanding monopoly position, Microsoft's unrestrained use of predatory pricing, exclusionary contracts and discriminatory terms and condi-

tions were clear violations of U.S. antitrust law. Jackson's impressively detailed analysis seemingly proved this once and for all.

Nevertheless, the harshness of the judge's opinion left me with a distinctly queasy feeling, the sort of unease you get when you know that something isn't right. Remarkably, despite Microsoft's many improper acts, I can't help but feel that it has been treated unfairly. For example, Jackson had to work very hard to show that consumers have been harmed by Microsoft's behavior, but he all but ignored Microsoft's many obvious contributions. Similarly, while the judge recounted many of the things that Microsoft has done to harass and harm its competitors, he virtually never mentioned the even greater damage these companies have often inflicted upon themselves.

The result is an unnecessarily unbalanced and overly harsh view that has left Microsoft highly exposed to all sorts of future litigation. We live in a country where even a respected but struggling company like Toshiba can be shaken down for \$2 billion because some of its laptops had a theoretically faulty floppy drive that might have corrupted some users' data. Worse still, as the tobacco and gun industries have demonstrated, once the federal government has formally demonized a wealthy company or industry, it's pretty much

open season for the lawyers. Microsoft would be wise to settle this case before these findings of fact become entrenched as findings of law.

But don't get me wrong. Both the courts and the Department of Justice have undoubtedly performed a valuable service. Almost regardless of whatever settlement or remedy might eventually emerge, Microsoft has already softened its competitive behavior to the great benefit of competitors such as RealNetworks, Red Hat, Gateway, 3Com and others. More fundamentally, Microsoft really has only itself to blame for not recognizing, despite repeated warnings, that the government was serious in its concerns. With a little bit of wisdom, humility and respect, this horrible situation could easily have been avoided.

From this perspective, Jackson's harshness might prove a blessing if it helps Microsoft to finally understand what so many of us have been saying all along. No one wants to take away Microsoft's right to innovate, and as long as Microsoft makes this the center of its defense, it may as well argue with itself. This case isn't about innovation; it's about behavior. And it happens to be the law of the land that monopolists have to play by different rules than other companies. It's a real shame that it is taking Microsoft so long to accept such an obvious and not particularly threatening reality. ■

READERS' LETTERS

You should keep maintenance in mind when calculating depreciation

ALTHOUGH the Business Quick-Study on depreciation and amortization [Oct. 18] was a very good overview of the subject, it ignored one aspect of the depreciation of tangible assets that must be considered for accurate

reporting of the true expense of owning any such asset. Repair and maintenance costs generally increase over the life of any piece of equipment, particularly so for those with moving parts.

As a result, using straight-line depreci-

ation would result in greater total annual expense in the later years of an asset's life, unless it is covered by a full maintenance agreement or extended warranty. Using declining balance depreciation would result in a more "level" expense — the smaller depreciation expense in later years is offset by the increased repair and maintenance costs.

Robert E. Hubbard
Tampa, Fla.

What's new?

IAGREE wholeheartedly with David Moschella's column "A 'New Economy'? Don't Believe It for a Second" [News Opinion, Sept. 27]. The term *new economy* is indeed very misleading, ill-conceived and misused. There is really little new about this economy. The last time I checked, supply and demand still worked exactly the same.

What is maybe new is the way we coordinate and execute transactions. These are much faster, more economical, networked, interactive and maybe virtual than in the past, and more and more they tend to be digital. All of these developments, no doubt, are welcomed, exciting and relatively new. They do not, however, make for a new economy.

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More Letters, page 42

COMPUTERWORLD welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Allan E. Alter, columns editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 875-8931; Internet: letters@computerworld.com. Include an address and phone number for immediate verification.



DAVID MOSCHELLA is an author, independent consultant and weekly columnist for *Computerworld*. Contact him at dmoschella@earthlink.net.

Ellison's predictions are off the mark

THE LAST TIME I checked, Larry Ellison's ERP package was getting its lunch eaten by SAP ["Larry Ellison to IT: You're Becoming Obsolete," News Opinion, Oct. 18].

As long as companies want solutions customized to their exact needs and wants, large central IT departments are as safe as could be. Application service providers sound good to the users until they find out that they cannot get what they want.

God bless SAP!

Thanks to them, I don't think I will have to be looking for a job in a new industry before I retire in 2013.

Randy Bretall
Irvine, Calif.

OF COURSE Larry Ellison advocates an end-run on IT professionals. That isn't news. IBM has used that technique for years. It would be wolves in the sheep pen, and IT to clean up the mess. Of course, what's new there? **John Pittaway**
Santa Ana, Calif.
jpittawa@pacbell.net

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ALLAN E. ALTER

Want happy customers? Don't tick them off

MY AUTO REPAIR SHOP once set my car on fire. Recently, my long-distance carrier, a company that prides itself on customer service, called me about 44 cents I owed it. Guess which experience still burns me up? The answer says a lot about the state of computing and customer service.

When your number's up, it's up. And around 8:15 on a recent morning, a computer decided it was time. A phone company representative called while I was rushing to get ready for work to say my account was 60 days overdue and ask if I'd like to pay the balance by credit card.



ALLAN E. ALTER is Computerworld's columns editor and department editor, managing. Contact him at allan_alter@computerworld.com.

Now everyone knows not to give out a credit-card number when a stranger calls. Even little kids know you just don't do that. So I hung up, then tried to call the 800 number on the back of my dialing card.

I couldn't get through. I tried again that night, and after five attempts over

three-quarters of an hour, I finally reached the phone company. I was overdue 60 days all right—but only by 44 cents, not the much larger amount I was told that morning.

That didn't exactly put me in a good mood. But what bugged me more was what I was hearing from the service reps. Why did I have trouble getting through? Monday's always a busy day, said one. A new computer system, said another. Why was I called, and at the worst possible time in the morning? The computer triggered it. And why was I asked to pay by credit card? As a customer convenience, I was told.

Convenience? The rep read her script so fast it sounded like a hustle.

The rep made a note that I don't like to receive phone calls. The matter was over. Or is it?

Today, I still go to the repair shop that set my car on fire. They ripped up my bill, but that's not all. They do honest work, provide great service and don't rip me off.

This phone company? They treated the computer as some uncontrollable force. Their 800 number was a nightmare. And their reps thought it was OK to quickly ask for credit cards.

The fact is businesses still don't understand how to make computers and people work together effectively in providing customer service. Lack

of reliability as well as incompetence and the inability to share information are part of the problem. But I suspect something else is at work: Companies don't understand what drives customers nuts.

Companies work hard to figure out how to please customers. They collect data on customer preferences, stuff it into databases and look for correlations. That's helpful, of course. But shouldn't they also collect data on what their customers detest and build systems that use this information? These sophisticated billing systems should be programmed to avoid actions that damage relationships.

I'm all in favor of using IT to provide customer service. But frankly, given my druthers, I'd rather see companies use IT to prevent poor service.

I'd like to see someone build a customer relationship antismismanagement system. The system shouldn't let reps call me during the morning rush hour, ask me for credit-card information or pester me about 44 cents overdue.

I don't know if this company is using a customer relationship management system. But I'll say this: If you want to build a relationship with a customer, figure out what will tick him off. ▀

BRUCE SCHNEIER

Satan's computer: Why security products fail us

ALMOST EVERY WEEK, this newspaper covers a security flaw: another virus that exploits Microsoft Office, a vulnerability in Windows or Unix, a Java problem, a security hole. Why can't vendors get this right, we wonder? When will it get better?

I don't believe it ever will. Here's why:

Security engineering is different from any other type of engineering. Most products, such as word processors, are useful for what they do. Security products, or security features within products, are useful precisely because of what they don't allow to be done. Most engineering involves making things work, while security engineering involves making things not work—and then preventing those failures.

In many ways, this is similar to safety engineering. Safety is another engineering requirement

that isn't simply a "feature." But safety engineering involves making sure things don't fail in the presence of random faults: It's about programming Murphy's computer, if you will.

Security engineering involves making sure things don't fail in the presence of an intelligent and malicious adversary who forces faults at precisely the worst time and in precisely the worst way. Security engineering involves programming Satan's computer.

And Satan's computer is hard to test. Virtually all software is developed using a try-and-fix methodology. Small pieces are implemented, tested, fixed and tested again. Several of these small pieces are combined into a larger module, and this module is tested, fixed and tested again. The end result is software that more or less functions as expected, although in complex systems, bugs always slip through.

This just doesn't work for testing security. No amount of beta-testing can ever uncover a security flaw. Remember that security has nothing to do with functionality. If you have an encrypted phone, you can test it. You can make and receive calls. You can try, and fail, to eavesdrop. But you have no idea if the phone is secure or not.

The only reasonable way to "test" security is to perform security reviews. This is an expensive, time-consuming, manual process. It's not enough to look at the security protocols and the encryption algorithms. A review must cover specification, design, implementation, source code, operations and so forth. And just as functional testing can't prove the absence of bugs, a security review can't show that the product is in fact secure.

It gets worse. A security review of Version 1.0 says little about the security of Version 1.1.

A security review of a software product in isolation doesn't necessarily apply to the same product in an operational environment. And the more complex the system is, the harder a security evaluation becomes and the more security bugs there will be in the product.

Suppose a software product is developed without any functional testing at all. No alpha or beta testing. Write the code, compile it and ship. The odds of this program working at all—let alone being bug-free—are zero. As the complexity of the product increases, so will the number of bugs. Everyone knows testing is essential.

This is where we are in security. Products are being shipped without any, or with minimal, security testing. And the products are getting more complex every year: larger operating systems, more features, more interactions between different programs on the Internet.

Windows NT has been around for a few years, and security bugs are still being discovered. Expect many times more bugs in Windows 2000.

Expect the same thing to hold true for every other piece of software.

This won't change. Computer usage, the Internet and convergence are all happening at an ever-increasing pace. Systems are getting more complex, and necessarily more insecure, faster than we can fix them—and faster than we can learn how to fix them. ▀



BRUCE SCHNEIER is chief technology officer at Counterpane Internet Security Inc. in San Jose and publisher of the "Crypto-Gram" newsletter. Contact him at www.counterpane.com.

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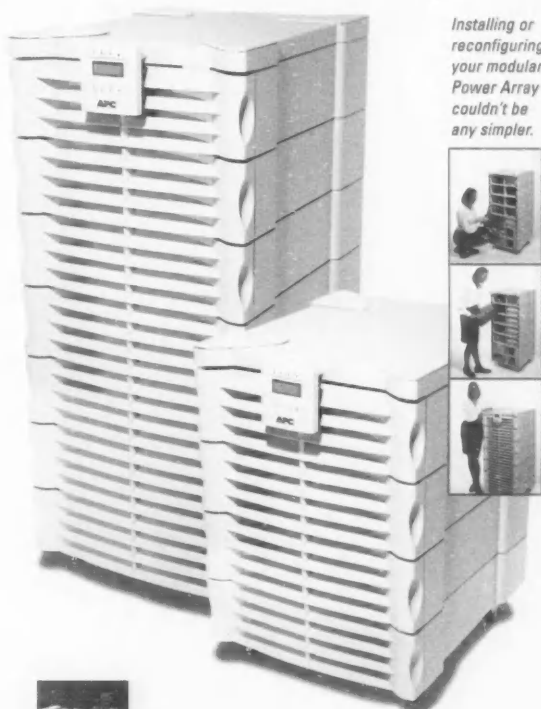


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- Bob Leshner and Charlie Bise, Information Technology, Exel Logistics

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READERS' LETTERS

Question of reliability sparks cost vs. benefit debate

IN RESPONDING to Alex Torralbas' column in *Computerworld* ["Stop the Madness! 12 Ways to Make Computing Reliable," News Opinion, Oct. 11] let me provide some history: When IBM was dominant (in the 1960s), software was completely reliable.

Microsoft discovered that one can make a lot of money by getting a product into the customer's hands soon. It announced delivery dates for products that did not exist (vaporware). As soon as the product functioned at all, before the extensive and time-consuming testing began, it delivered and made a lot of money. The rest of the world followed suit, because Microsoft is too strong to fight.

We have to fight back. We have to insist that vendors do proper quality tests by outside sources. When software is reviewed, we have to insist that the amount of time spent testing be included in the review.

We also have to mention who did the testing — in-house or whatever. If we make this more public, people will buy from the vendor that tested for the longest time and so has the most reliable software.

Sanford Aranoff
National Utility Service
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IREAD Alex Torralbas' column with great interest. I was hoping for some educated insight or at least a galvanizing 12-step plan.

How disappointed I was to find just another tirade.

In my experience, many businesses in the private sector have very tight budgets for their IT needs.

Our industry ought to

be looking at ways of bringing down the price of software and hardware and their integration, not increasing it!

Many of Mr. Torralbas' suggestions will result in dramatic increases in the total cost of ownership.
Martin Mc Kerrell
Research and development leader
Geac Public Safety
Tampa, Fla.
mmckerr@geac.com

the executive vice president.

After a moment's thought the executive vice president replied, "I didn't mean never; I meant almost never!"

This is not risk management. This is guesswork. I am confident that Torralbas would agree that in every real-world system, we must balance cost against benefit, in this case the reduction (not elimination) of service interruption losses.

Robert V. Jacobson
International Security Technology Inc.
New York
jacobson@ist-usa.com

ALEX TORRALBAS Stop the madness! 12 ways to make computing reliable

WE TAKE dial tones for granted and assume that electricity will be there when we plug something into an outlet. We board airplanes knowing the risk of crashing is remote.

The simple fact is that the infrastructure of modern society was built to be reliable, predictable and safe.

But now we depend on a new infrastructure: PCs and the Internet. Neither of these is reliable or predictable. Well, perhaps one thing is predictable: They will fail daily in some capacity — from program crashes and system lockups to service outages, slowdowns and stumbers that send vendors and IT departments into finger-pointing suits.

This infrastructure is where the world's economy is unpacking its moving crates and settling in. That's scary.

It's an infrastructure knitted with black holes of responsibility. When things break down, nobody — not IT, not the telcos, not anyone — says, "The buck stops here."



ALEX TORRALBAS is a consultant to small and mid-size companies after many years in the travel technology field. Contact him at atorralbas.com.

BECAUSE Alex Torralbas did not attempt to cost-justify his solutions, I conclude that he is trying to provoke readers into thinking harder about reliability of computer systems.

Consider this true story: An executive vice president at a large bank told his CIO: "Fix our IT systems so we never have an outage!" The CIO priced out a completely redundant data center with real-time data backup and reported back the substantial cost to

ALEX Torralbas' self-righteous, utopian whining is worthless filler for your journal.

If he is so dissatisfied, tell him to leave the industry. On his way out, you can give him his utopian wish: a pencil and paper.

While you're at it, give him a history book and a free-market philosophy book to read before he writes such poorly thought-out drivel.

John Dogger
Network and communications manager
Argents Express Group
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Data in agreement

THE SOCIETY for Information Management Y2K Working Group's data basically says the same thing as the Meta Group data reported in

Thomas Hoffman's Oct. 18 article ["Report: Code Quality to Take a Hit," Page One]: IT quality practices, although they appear to have taken some perhaps Y2K-related upticks in '97 and '98, have largely degraded over the past year (see the "silver linings" article on my Web site at www.unt.edu/bcis/faculty/kappelma).

Of course, at the same time, some enterprises have seen significant improvements. It's unclear how this will play out next year, but it does not bode well for generally improving

IT quality practices, be they for new development, integration, maintenance or anything else.

Leon A. Kappelman
Associate professor

Business computer information systems
College of Business Administration
University of North Texas
Co-chair, Society for Information Management Y2K Working Group
kapp@unt.edu

More than one way of looking at H-IB issues

ALL THE discussion about H-IB visas ["H-IB Miscoount May Alter '00 Quota," Page One, Oct. 11] ignores one important point: They are not solely for the computer industry, and the excessive use of them in that industry causes hardship in other industries.

It seems to me that the real purpose of the H-IB program is to meet peaks of cyclical demand for highly technical skills from available overseas experts.

The ongoing shortage of IT workers is probably not cyclical. I suspect it is not due to a lack of training either. Most of the really good programmers I have known had little, if any, formal training.

The natural abilities that make a good programmer are probably present only in a small percentage of any population, and the very advanced economy of the U.S. needs more such persons than live in the country. The only sources for such workers are foreign countries, most likely those with less advanced economies but reasonable levels of education and widespread knowledge of English.

Les Denham
Vice president
Interactive Interpretation & Training Inc.
Houston

WHILE reading the article about the H-IB miscount, the first question that arose in my mind was, What will be the psychological effect on those unlucky professionals who landed here with big dreams?

In my opinion, the Immigration and Naturalization Service should give utmost importance to those extra H-IB holders and reduce the quota for 2000.

Jaganadha R. Karra
Alexandria, Va.
jkarra@usa.net

ITAKE exception to Maryfran Johnson's editorial "Political Arithmetic" [News Opinion, Oct. 18], in which she labeled those opposed to higher immigration quotas as "yahoos" promoting "racist arguments" to protect American jobs. I oppose the higher quotas and am neither a racist nor a yahoo.

She also claims that these groups use "bogus statistics" to argue their case.

If *Computerworld* is willing to let Ms. Johnson throw these accusations around, then it should also be willing to let her publish her side of the story, complete with statistics, and then give the "yahoos" equal space to rebut her case.

Steven Dendifender
Columbus, Ohio

HAVING just come back from two ERP conferences where every consulting company was feeling the squeeze, I was amazed in reading Maryfran Johnson's "Political Arithmetic" in the Oct. 18 edition at how perceptions differ.

Consulting companies at the conferences had too many consultants on the bench, not the other way around as Ms. Johnson perceives, many of them H-IBs. Also, some companies (not the consulting variety) have more technologists than they need, at least in the ERP segment of our industry.

I am surprised that we do not let the free market handle this shortage or overage (depending on your perception) through economic functions called supply, demand and price. But then I remember that the groups that present bogus numbers of technical expertise shortages are also the same groups that contribute large dollar amounts to political campaigns and advertising.

Tad Stephens
Southlake, Texas
birdwell@gte.net

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- Peter Nikonowitsch, Engineering Manager, Hitachi Semiconductor



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From the editors of *InfoWorld* to the readers of *Computerworld*

SPECIAL REPORT PART TWO

INFO
WORLD

STORAGE-AREA NETWORKS

ENTERPRISE SOLUTIONS

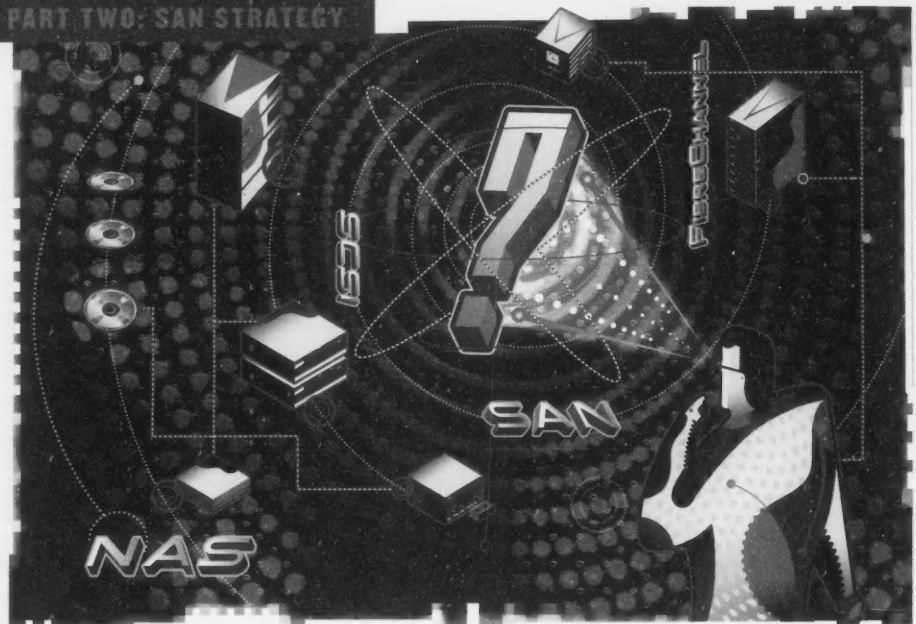
Finding your storage path

Multiple storage choices can leave you lost and confused, unless you have a clear strategy. Here's how to decide.



PLUS: Deciding which strategy is right for you

PART TWO: SAN STRATEGY



Choose wisely

Picking a clear storage strategy is difficult but not an impossible task

By Eric Hammond

WHEN PLANNING a storage strategy, there are plenty of options. In fact, you may have too many choices: storage-area networks, network-attached storage, and centralized vs. decentralized storage. Add to that the sea of acronyms and buzzwords that come with them — SCSI, RAID, Fibre Channel, online, and near-line — and, suddenly, picking a clear strategy seems futile.

But if you step back and look at the big picture, think about your long-term needs and then start working through the details, a clear strategy can emerge. Let's explore different options for storage strategies and look at the pros and cons of each.

The three options that we'll look at include

the traditional storage model, network-attached storage (NAS), and storage-area networks (SANs). We'll look at how each of these is implemented, the issues you might face in utilizing them, as well as the benefits each brings to the table.

THE TRADITIONAL MODEL

For lack of a better term, let's call server-attached storage the traditional storage model. In this model — most prevalent in organizations today — storage devices are attached directly to the servers that use them.

Traditionally, storage devices — which may include disk drives, tape drives, optical drives, RAID systems, tape libraries, and optical jukeboxes — are directly attached to servers. Of course, you may also find any of these devices attached to various client sys-

tems, but let's focus on the server for now.

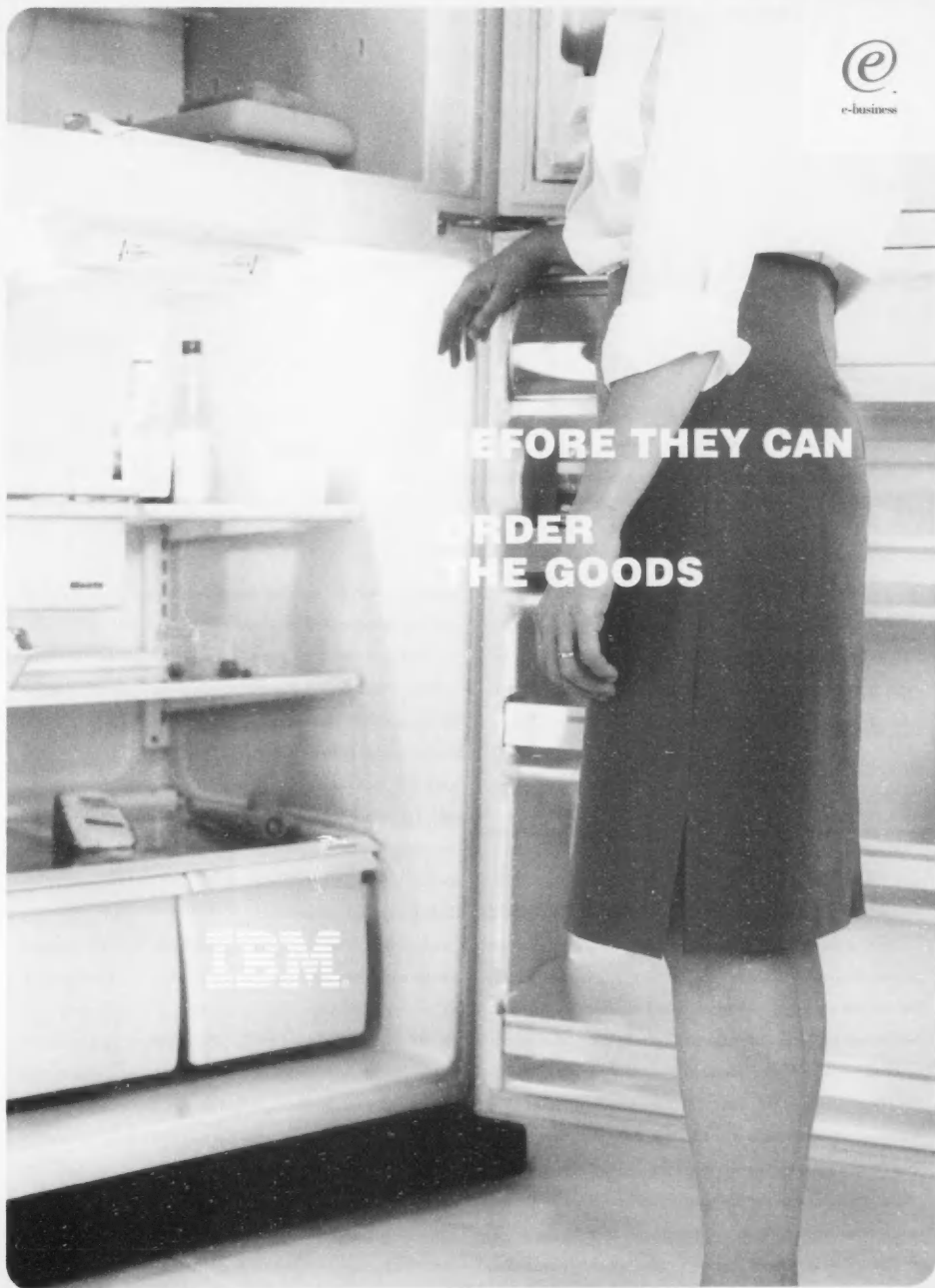
At the enterprise level, most of these devices are attached via SCSI.

The biggest benefit to the traditional model for storage is that it is understood well. People have been carrying it out for a long time, and they know how to make it work. Server-attached storage isn't going to disappear anytime soon. It does, however, create some problems that other storage strategies can alleviate.

On the lower end — say in the workgroup file and print arena or in the small application server market — server-attached storage brings a lot of complexity and cost to the table that might not be necessary. For example, is it really a good idea to maintain a Windows NT 4.0 server, which is designed to meet a variety of enterprise-computing

» CONTINUED ON page S7

ILLUSTRATION BY JIMMY LORR



**BEFORE THEY CAN
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THE GOODS**



FYI The supermarket chain meets the supply chain. On the Web, access to timely information helps suppliers keep products in stock, inventories low and customers returning.



FYI Company employees can quickly cap turnover over an intranet to determine who's buying.

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IBM ENTERPRISE SAN

A MORE RELIABLE WAY TO MANAGE e-BUSINESS INFORMATION.

Without a doubt, the success of your e-business relies on greater numbers of people being able to access even greater amounts of information. Whenever and wherever they need it. Keep even one person waiting, and business may go elsewhere.

It's your job to make sure that doesn't happen.

The challenges are many. For instance, as more of your business continues to migrate to the Web, the demand for information will touch everything from e-commerce to supply chain management to business intelligence to customer relationship management.

You will have to more efficiently manage the ever-increasing

amounts of information that e-business requires – information that can grow by 800 percent every year.

You will have to provide customers, employees and suppliers with round-the-clock access to timely information on a variety of platforms – even during peak traffic periods. And, should any data accidentally be deleted or derailed, you will have to be able to recover it quickly – before any business is lost.

How you store, manage and protect this valuable resource can be the difference between closing a sale and a closed door.

SEPARATE THE STORAGE FROM THE STORE. If your company is like most, crucial information is spread across a variety of task-oriented servers. These one-to-one server and storage relationships are neither practical nor efficient when dealing with huge volumes of e-business data.

An IBM Enterprise Storage Area Network (SAN, for short) takes an entirely new approach. Basically, a SAN is a separate, centrally managed network dedicated to managing information.

THEY HAVE TO ACCESS THE INFORMATION



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VE TO OR MATION.

(Technically, a SAN is a combination of hardware, software and networking devices. It uses high-speed fibre channel technology to connect different types of servers and storage formats in a many-to-many configuration.)

Instead of having separate "islands of information," an IBM Enterprise SAN gives you a shared pool of data that can be accessed by everyone.

The benefits are enormous.

Consider this: as much as 60 percent of LAN traffic stems from data backup. By moving storage to a SAN, you will free up bandwidth so user requests can be handled more quickly, while data backups can be completed in much less time (a backup that once took 6 hours can now be done in 20 minutes).

You can put new and updated information up on your Web site in one-quarter of the time needed previously. You can easily "plug in" additional storage capacity without taking your systems offline. And you will have a far more cost-efficient and staff-efficient way to manage all your multi-platform and multilocation information.

PEOPLE WHO GET IT. PEOPLE WHO CAN MANAGE IT. Only IBM can offer the complete range of services, hardware, software and technology needed to successfully get your Storage Area Network off the ground.

IBM Global Services has decades of storage experience spanning a variety of industries and platforms, as well as scores of qualified storage consultants on hand. People who can help you transform your current systems into an open and integrated SAN solution — one that is designed to extract the most value from your data.

What role does your information play in e-commerce, in supply chain management, in business intelligence, or in enterprise resource planning? From early consulting, planning and design through implementation, IBM Global Services will help you align your SAN and business priorities so information flows more freely.

If you're going to do business on the Web, it's imperative that information is consistently available, secure and well-managed. All the time. IBM can help here, too.

Tivoli Systems Inc., a worldwide leader in IT management solutions (and an IBM company), can help you meet the





IBM IS AN IDEAL PARTNER FOR ANY COMPANY LOOKING TO MOVE ITS CRITICAL BUSINESS INFORMATION TO A SAN. HERE'S WHY:

FYI

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The 131,000 people of IBM Global Services have the experience and skills to transform your current storage systems into an open, responsive and cost-effective SAN solution.

FYI

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FYI

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FYI

TIVOLI STORAGE MANAGEMENT

Tivoli provides an integrated, open and end-to-end SAN solution for managing backup, archiving and data recovery from a single location.

complex demands of managing a SAN. Tivoli's fully integrated and end-to-end SAN management solutions feature LAN-free backup, archiving and data recovery across virtually all platforms. You get a central view of information across your enterprise, improved data throughput and drastically reduced backup and restore times.

Your users get something, too: access to the information they crave.

The magic box is an IBM @ business server.

Information can magically transform your business into an e-business. Provided that the servers handling your information are accessible, scalable and secure, IBM excels at getting the magic out of the box.

In fact, no one understands e-business better than IBM, because no one knows storage and servers better than IBM. Take our Netfinity® servers. Leveraging years of enterprise experience and cross-platform know-how, a Netfinity server is designed to power your SAN with minimum effort and maximum results. Think of it as a high-availability e-business server at an affordable price – a magic box.



Where you store information is as important as what's being stored. IBM is a leader in storage technology. Like the IBM Enterprise Storage Server.™ It speeds up access to information across all major platforms – Windows NT®, UNIX, AS/400®, S/390® and Novell® included. It can be upgraded with additional storage capacity, on the fly. And it provides a foundation for true data sharing – the ultimate magical promise of Storage Area Network technology.

START WITH WHAT YOU HAVE. BUT START. If you're looking to make the transition to a SAN, you don't have to start over. But you do have to start. (We estimate that by the year 2002, roughly 70 percent of medium- and large-sized companies will have implemented a SAN to manage their e-business data.)

IBM can show you how your existing storage systems can be combined with today's leading technologies and innovative thinking to provide your customers, suppliers and employees with fast, secure and reliable access to information.

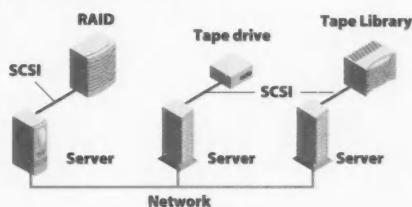
To find out how IBM can help you design and deploy an IBM Enterprise SAN that will enable your information to keep pace with the endless demands and infinite growth of your e-business, access our information at www.ibm.com/san

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Storage strategies

There are plenty of storage strategies available, and choosing the right one requires a thorough analysis of your current and future needs.

Server-attached storage



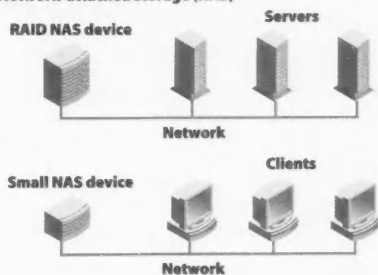
Pros

- Well-understood
- Server flexibility

Cons

- Storage devices bound to servers
- Reconfiguration difficult

Network-attached storage (NAS)



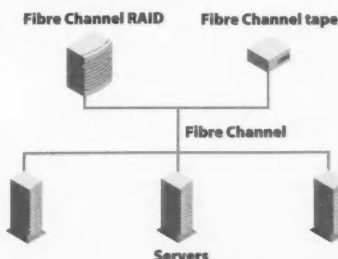
Pros

- Servers can be added
- Easy administration

Cons

- Network is failure point
- Decentralized

Storage-area network (SAN)



Pros

- Highly configurable
- High-performance
- Very reliable

Cons

- Expensive
- Some technologies immature

CONTINUED FROM page S2

needs, for a workgroup that merely needs to share files and access a common printer?

Although the answer for many organizations today is "yes," it's pretty clear that an appliance-like device created for the single purpose of sharing files and printers for desktop users could be a more attractive option. It would seem wise to eliminate the hardware and software that isn't really needed to perform the task at hand. We'll explore this more in the NAS section.

At the high end, the problems with server-attached storage are more complex. Let's start with SCSI. SCSI is certainly a great protocol. But to implement it, one must face some harsh realities. Although the latest version of SCSI is light years ahead of the original SCSI specification in terms of performance, cable lengths, and the number of devices on the bus, some problems remain.

You can attach up to 15 devices to a SCSI bus, but many of the devices out there, including disk drives and modern tape and optical drives, can monopolize most of the bandwidth on the bus, even when the bus speed is 40MBps.

This isn't a big deal on a server with a few disks and a tape drive. But suppose you want to attach a library with six tape drives and a robotic tape picker, all of which are SCSI devices. At most, you can expect to attach two tape drives to a SCSI bus and still manage to get the best performance out of them. Even assuming that you put the picker onto an existing SCSI bus (it should not require that much bandwidth), you're still looking at adding three SCSI buses to the host system. How many PCI slots does it have, anyway?

Fibre Channel can solve some of these problems, even in a server-attached scenario (as opposed to a Fibre Channel-powered SAN). Fibre Channel allows more devices to be attached to a faster bus. But, because currently no tape drives can be directly attached via Fibre Channel (they all

require a bridge between the Fibre Channel and the SCSI drive), the SCSI issue doesn't completely disappear, although you can reduce the number of SCSI adapters that are required on the server.

The next problem with server-attached storage is capacity planning. Backing up a set of servers typically involves attaching a tape drive or tape library to one of the servers, which then becomes the backup server. Depending on the backup demands, this can require an additional server on the network, simply to provide access to the tape drive. There has to be a better way.

Solutions to many of these problems may exist in either a NAS or a SAN environment.

NETWORK-ATTACHED STORAGE

NAS is a strategy whereby traditional servers are replaced with storage "appliances" — devices with specific storage functions, and little other capability.

NAS holds appeal as both a workgroup solution and a solution in some high-end scenarios, such as Web server farms and enterprise applications. Let's look at some of the NAS options.

On the workgroup side, several different appliances that are available offer workgroup file and print capabilities. Their functionality usually includes Unix Network File System (NFS), Windows SMB (now called CIFS), Macintosh, and NetWare file serving.

These NAS devices are designed to be set up quickly and maintained easily. This is accomplished by eliminating the hardware and software that is required by a traditional server, which needs to perform many tasks in addition to file and print services.

NAS file-serving devices can be deployed throughout an organization to push file services for workgroups down to the workgroup level. This can make it easier to manage traffic on the network and minimize the organization impact of a failure in a workgroup server.

Of course, the very problem with decentralized resources is

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decentralization. It can make management a headache in larger organizations and can ultimately increase the administrative costs it was designed to reduce. In some cases, larger NAS devices might be needed, or traditional servers might be the right choice — it really depends on your unique needs.

NAS offers high-end solutions as well. These can be handy for larger organizations hoping to provide centralized workgroup file services, or for Web farm and enterprise application environments. These solutions work like low-end solutions, but they include high-performance RAID, multiple network connections, and high-speed network protocols, such as Gigabit Ethernet.

These high-end solutions can obviously handle significantly more users in a file and print environment than a workgroup NAS solution. In a Web farm environment, fast NAS solutions can make propagating content to the servers much easier. The updated content simply needs to be loaded on the NAS device, and because the servers all access the

NAS device for their data, the content is updated across the farm. Obviously, capacity planning on the network and on the NAS device is critical in ensuring that the NAS device doesn't become a giant bottleneck.

Enterprise applications hosted on multiple servers can also access data shared on a NAS device. By offloading storage from the servers, you can split storage from servers in capacity planning, which can simplify the process and provide you with more flexible configuration options.

The drawback to NAS in both the Web farm and application environment is that the network becomes a failure point between the storage and the server. In the NAS scenario you have to plan your network with the same reliability that you expect from your SCSI bus, or you have to ensure that your applications can tolerate a sudden loss of data access like you would have in a SCSI adapter, cable, or device failure.

STORAGE-AREA NETWORKS

SANs offer a storage solution decoupled completely from the server with enterprise-

class performance, high reliability, and high capacity — albeit with high price tags. In many scenarios, a SAN can provide the ultimate storage solution.

Unlike the traditional server-attached storage model, SANs connected with Fibre Channel provide shared access for servers to storage devices such as disks, tapes, and optical disks. And unlike the NAS solution, SANs remove all server functionality from the storage device, leaving this functionality up to the servers and management devices on the SAN.

Fibre Channel, which performs like SCSI on steroids, supports hundreds of devices connected to one Fibre Channel loop, provides blinding transfer rates, and allows multiple hosts to share access to devices on the SAN. This can simplify capacity planning and provide a great deal of configuration flexibility. SAN implementations can ensure the most efficient use of resources — such as tape libraries — by making these resources available to all the hosts on the SAN at all times.

A SAN is perfectly suited for situations in which an application (whether electronic commerce or enterprise resource planning) or a large group of users needs fast, reliable, and secure access to vast quantities of centrally stored data.

The downside to the SAN architecture is its maturity, or lack thereof. Serious compatibility issues must be overcome to implement a SAN in a heterogeneous environment. In addition, the software and hardware tools that will allow us to realize the full potential of the SAN architecture are years away. Finally, SANs and SAN storage-devices come with a hefty price tag. This means that your SAN strategy will have to be carefully thought out beforehand.

BOTTOM LINE

There are many options for a storage strategy, so you should be able to find a path that works for you. Keep in mind that the stakes have never been higher for a successful storage strategy, given the industry's insatiable appetite for data. By carefully planning your strategy based on your organization's unique needs — with future needs in mind — you won't see your storage dollars and effort go to waste.

STORAGE-AREA NETWORKS

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How to pick the right storage strategy

Which storage strategy is right for you? There are many options and factors to take into consideration, but a few generalizations can be made.

The traditional server-attached storage model certainly won't disappear. Even as new choices become available, there are some compelling arguments for server-attached storage.

In some organizations, file and print services and applications servers can share a common platform. In this scenario, having one server platform to manage can provide the simplest solution. In addition, if capacity demands are well-understood and fairly static, they can be nailed down with a server-attached strategy.

In situations in which storage demands are changing constantly or growing explosively, the flexibility provided by network-attached storage (NAS) and storage-area network (SAN) implementations can provide a more dynamic foundation for a storage strategy than does server-attached storage.

NAS solutions hold a great deal of appeal at the workgroup level. In situations in which an organization has few workgroups that need only file

and print services, in small offices that have similar needs, or in small remote offices of larger organizations, low-end NAS devices can significantly reduce administrative headaches.

Likewise, for demanding file and print applications or for Web farms and large, storage-intensive applications, higher-end NAS solutions may hold some appeal. In these scenarios, they can centralize and simplify file and print administration, provide an easily updated storage option for Web content, and provide enterprise applications with high-performance shared storage.

Many organizations are planning or implementing SAN solutions in their data-center environments. When capacity, throughput, and reliability are critical, and when storage needs are changing and capacity demands are rapidly increasing, you can't beat the dynamically reconfigurable nature of the SAN environment.

Of course, there are many factors to consider when choosing a storage strategy. Investing time and resources up front to assess your organization's needs will save you from having to rethink your strategy after your solution is in place.



BUSINESS

WEB MISHAPS

The number of eyeballs a site attracts doesn't determine its success. New marketing tools make it easy to attract an audience for your latest promotion, but if marketers haven't pulled IT into the plan and prepared for the onslaught, they could lose all that potential business. **49**

KEEP TRUCKING

Trucker Sitton Motor Lines is buying in to the same kind of software airlines use to keep seats filled at the best rates, hoping yield management works on the road as well as in the air. **52**

RECOUPING Y2K COSTS

Could standard business insurance cover Y2K remediation costs? One lawyer says yes. But others argue the approach is a waste of time and users shouldn't expect much help from insurance companies. **56**

FOOD SAVINGS

One restaurant chain saved more than \$300,000 by automating data flow and reporting — even before finishing its system. Simplified sales reporting lets the people who do pricing and promotions react to the ones that work. **61**

WHISTLE-BLOWERS

IT professionals may blow the whistle on their companies' non-Y2K-compliant systems

out of concern for public safety and worries about economic fluctuations. And the threat of being fired may no longer stop them. You can't stop potential whistle-blowers, Ed Yourdon warns, but you should be prepared ahead of time. **62**

RECRUITING TIPS

What are the top 10 recruiting tips from pros who attract techies with the hottest skills? Create an entrepreneurial environment, establish an alumni network, offer employee referral bonuses. But once you've found the techies, you still have to persuade them to join the team. **71**

BEYOND SPEED

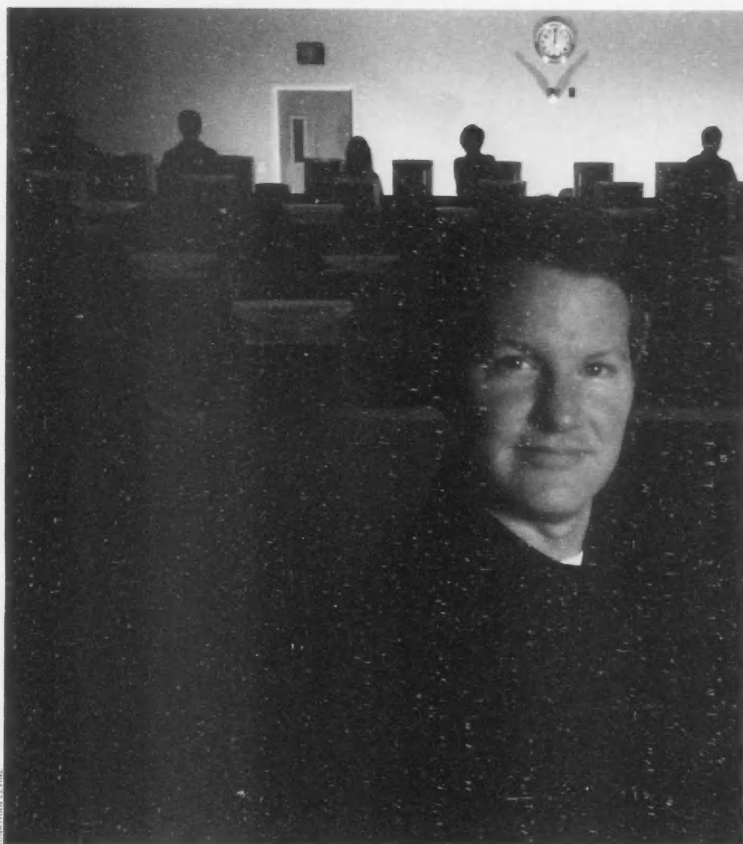
Speed alone isn't enough to keep E-customers happy. They expect you to save them time online and link them all the way through to the production systems so they can launch production runs of the one unit they want, in real time, at their convenience. Sheesh. **72**

OUTSOURCING HAZARDS

Hiring a third party to take care of IT operations may relieve some headaches, but it generates others — if the managers supervising outsourcers aren't up to the job, or if they're stretched too thin. **76**

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TECH HIRING: AN INSIDE JOB

DAVID WESTMORELAND (above) is one of many IT managers who are training existing employees and hiring internally, rather than recruiting outsiders, to meet their need for new skills, according to the 1999 *Computerworld* Skills Survey. One-third plan to invest training dollars in Java skills, while 39% are investing in HTML and 18% in C++. IT managers say they'll even hire people from the business side, if they're willing to learn.

64



HOT CO.s

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COMPUTERWORLD
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Online Marketing Tools Can Cause IT Disasters

It's easy for marketing to create demand, but what if IT isn't ready to respond?

BY JULIA KING

CONSIDER the cosmetics company that, in its rush to market and sell products online, wound up spending \$30 for every \$3 bottle of nail polish it shipped directly to consumers.

In another case, marketers at a major consumer goods company launched a fabulously successful Web site, generating more than 3,000 customer queries per day — but had no one available to provide answers.

The lesson: Creating demand is easy, especially as more marketing departments get their hands on new, easy-to-use tools for launching online promotions that bolster sales. But without extensive planning and coordination with information technology, satisfying that demand — and doing so at a profit — can be a nightmare.

Stressed Scalability

A classic example is the Victoria's Secret Internet fashion show last February. Hyped on TV commercials during the Super Bowl, the site drew more than 1 million viewers immediately. During the Webcast days later, what many thousands of those viewers got via their overstressed Internet service connections was jerky video and inconsistent sound.

"Every man in America turned to that site, but on Day 1, we didn't think about or build in high scalability," said J. Bruce Harrel, senior vice president of strategy at IBM, which helped build the Columbus, Ohio, lingerie company's Web site and now hosts it.

Even worse, "we had no idea [the marketing department was] going to put an ad on," added Harrel, who said he first learned of the fashion show idea during the Super Bowl break.

Communication breakdowns between marketing and IT departments are nothing new. But the speed of Web business can make missteps deadly.

"There tends to be an impression among marketing folks that eyeballs rule. For them, the whole deal is grabbing as much market share as you can. They have the tools, so all it takes to create a new marketing campaign is for someone to push out a [Web] page," said Steve Nevill, CIO at Gerald Stevens Inc., a flower and gift company in Fort Lauderdale, Fla.

But in reality, Nevill said, it takes a well-defined business process plus the discipline to stick to it for an online marketing program to really work.

Before any campaign is launched at Gerald Stevens, managers from marketing, IT and operations all must agree on precisely how it will be executed. The marketing group can use its own software tools to devise the campaign, but IT must know exactly what to expect, Nevill said. For example, marketing may issue digital coupons, which IT then must track separately from other sales data.

"We are getting the key business owners of campaigns to talk and agree up front, but with



MARKETERS CAN BE "more dynamic about offerings" if they have the tools to do promotions online, says Norman Dee of 1-800-Flowers

the Internet, that discipline is hard to come by," Nevill said.

The downside of such up-front coordination is that it takes time, and marketers in the e-commerce arena are especially time-sensitive, given the speed with which the competition can generate new sales campaigns.

"Still, the reality is that at the end of the day, you have to take orders, tie e-mails into a call center and tie the Web site into legacy systems, so the downside is really uncontrollable," said Jim Sterne, president of Target Marketing, a Santa Barbara, Calif., consulting firm.

Marketers at 1-800-Flowers-

com in Westbury, N.Y., also use their own software tools to devise spot promotions online.

"It gives them the ability to be more dynamic about offerings and more specific in their wording," because they have tighter control of the presentation, said Norman Dee, the company's IT director.

But IT also has built in a software-based fail-safe mechanism. It works by automatically pulling an online promotion once a preset inventory threshold is reached.

"That kind of fail-safe is more important for gift companies that deal with big emotions or big occasions because

Targeting Customers Online

A few tools designed to help marketers create promotions:

■ **Wired Empire, Burlington, Mass.:** Provides software for profiling online customers and developing customized marketing campaigns.

■ **Cogit.com, San Francisco:** Provides profiling and targeted marketing services.

■ **Verbind Inc., Boston:** Tracks online customer behavior and sends real-time marketing messages based on that behavior.

when you mess up on those, people get pretty annoyed," Dee said.

At DiscountDomain.com, an apparel Web site that caters to 12- to 24-year-olds, marketers put together spot promotions in a couple of hours, using real-time inventory data and real-time data from teen chat groups. They're capitalizing on so-called real-time trends. If teens are talking about a product that's in the Discount Domain inventory, marketers want to promote the item with special offers.

"I will pick the product that I think is pertinent, then work with the production and tech teams to link those products. It all happens in a few hours," said Catherine Jaccodine, general manager at the New York-based discount retail site, which is run by Delia's Inc. subsidiary iTurf Inc.

"These are incredibly powerful tools in the hands of marketers, but they have to be implemented and deployed by IT," said Matthew Roche, president of Forte Point Partners Inc., a San Francisco Web site development company. ■

Victoria's Secret Plans to Reinforce Webcast

The next time Victoria's Secret models strut down the fashion runway in a cybershow, their images will be broadcast to millions using much of the same technology that went into October's record-setting NetAid Webcast — not the setup that left Victoria's Secret's audience with jerky, blurred images last February.

"We've met with Cisco [Systems Inc.] and Akamai [Technologies Inc.] — both NetAid sponsors that donated hardware, software and services to the global fund-raising event — and we're trying to gain from their learnings," said Tim Plzak, director of advanced technologies at Limited Technology

Services, the IT arm of the lingerie maker's parent company, Intimate Brands Inc. in Columbus, Ohio.

For starters, Victoria's Secret will more widely distribute the heavy network traffic load that May's Webcast is likely to generate. Also, it relocated its Web site from a Schaumburg, Ill.-based IBM hosting facility it shared with other Web sites to a dedicated IBM site in Raleigh, N.C. This should give the company more control over technology, network connections, administration and security, Plzak said, adding that Victoria's Secret increased server and networking capacity at the new site by more than an order of magnitude over the previous site.

Victoria's Secret is also setting up dedicated network connections between the streaming video servers used during the Webcasts and big Internet service providers, such as America Online Inc. — a practice known as public and private peering. Last time around, tens of thousands of viewers used AOL as a point of entry to the fashion cybershow.

These connections should ease network bottlenecks where Internet service providers and the Internet intersect, Plzak guaranteed.

Finally, the company will take advantage of what Plzak called "significant improvements" in video streaming technology by offering IP multicasting to viewers with high-speed Internet access either via cable modem or Digital Subscriber Lines.

— Julia King

The problem isn't losing your customers to an e-business.
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Of course, creating a virtual investment firm is a bit more complex than just creating a web site. For starters, we had to link up all the disparate systems they had around the world. Security and reliability were paramount. So we leveraged their current investment by consolidating all their mission-critical

data onto one private network. And then expanded that network by including Internet access. After all, when you've got

a wholly owned, seamless global network*, you can give your customers pretty much anything.

Once their systems were merged, the real fun began. We built a web site that could integrate both their

private and public networks. Thus allowing enough free flow of information to enable their online customers to do everything they used to do in person. Open accounts. Conduct trades. Or simply transfer funds.

Not an easy chore. But sooner than you can say "point and click," it was all said and done. Old customers stayed. New customers joined. In short, an e-business was born. And that global investment firm got credit for making one very wise investment: an investment in satisfying their customers. For more details, visit us at www.wcom.com/data4.

MCI WorldCom has an entire continuum of data services on our seamless global network. Here's how we made it work for a global investment firm.

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BRIEFS

Renting Microsoft

Interiant Inc., an application service provider in Purchase, N.Y., said it plans to rent out Microsoft Corp.'s Office 2000 applications under Microsoft's Office Online pilot program. Customers will pay a monthly fee to use hosted, customized Office 2000 software under the service, which will debut during the first quarter of next year.

Y2K Emergency

Jamaica has become the first country to receive emergency year 2000 financing under an Inter-American Development Bank line of credit that was created to assist Latin American and Caribbean countries. A \$10 million loan will help the government convert and renovate computer systems to test systems and develop fallback strategies in the event of failures.

Online Management

Trilogy Software Inc. in Austin, Texas, released an upgraded set of applications that can be used to manage online sales and customer service. The MultiChannel Commerce 2.0 software adds new support for IBM mainframes and Sun Microsystems Inc.'s high-end Unix servers, plus support for standards such as Enterprise JavaBeans and the Extensible Markup Language. New applications for managing Web-site content and personalization will follow by year's end, Trilogy said. Pricing for the software starts at \$1 million.

Energy Trading

Atlanta-based Southern Company Energy Marketing has purchased \$3.4 million worth of trading technology from London-based British Telecommunications PLC to create one of the largest energy trading floors in the U.S. The installation is part of a trading infrastructure upgrade at Southern Company Energy Marketing, which trades in electricity, oil, natural gas and weather derivatives. The new trading floor is expected to go live next month.

Southern Company Energy Marketing is a joint venture of Southern Energy Inc. in Atlanta and Vastar Resources Inc. in Houston.

Software Fills Trucks, Maximizes Revenue

Sitton Motor Lines takes lead in applying analysis tool outside the travel industry

BY MATHEW SCHWARTZ

THE OBJECTIVES of trucking company managers aren't complicated: They want to keep their trucks filled with the loads that pay the most. One company, Sitton Motor Lines Inc. in Joplin, Mo., is on the leading edge of what analysts predict will be a trend in the trucking, retail and possibly computer industries: the use of yield management to achieve competitive advantage.

Yield management software isn't new. It has been used by airlines for more than 20 years to try to fill every airline seat, at the highest possible revenue per seat. Airlines made major investments in massive computing power to run ultrasecret algorithms that helped them load-balance their airplane networks. Today, cheaper computing power and more efficient algorithms have driven yield management software into rental car companies, hotels and cruise lines.

Now, analysts predict that yield management is going to make it big in the trucking industry. For one thing, "the industry in general is heavily unionized, which is driving up labor costs," said John Fontanella, an analyst at AMR Research Inc. in Boston. Also, trucking companies have made significant investments in technology recently. Take Sitton, a medium-size carrier. "Over the last few years, we've been implementing a lot of optimization software including decision-support systems to help match drivers to loads," said Jeff Thurman, Sitton's executive vice president.

The business case for yield management is simple, said Guillermo Gallego, an industrial engineering professor at Columbia University. "Yield

management is an effort to maximize revenues when you have 'sunk' investments in fixed capacity or fixed assets and a finite horizon over which you want to realize those revenues."

Sitton's goal in adopting yield management software, said Thurman, is "to book the freight that maximizes our profit and helps balance our network, while meeting the needs of our customers and drivers." The network comprises Sitton's fleet of 600 trucks and 1,200 dry-van trailers.

Sitton is using a package from Sabre Inc. in Burlington, Mass., called OptiYield-RT (for Real Time) to integrate yield management into its business techniques.

Easy Rollout

The software integrates rather seamlessly into existing operations; Sitton had no major difficulties during the three-week rollout. OptiYield runs on just one Intel Pentium 455-MHz machine running Windows NT. Now that the package is installed, the users — customer service representatives — still interface with the system through familiar AS/400 screens.

Nevertheless, and as expected, extensive training has been necessary for the 15 customer service representatives and executives who needed to learn the program, Thurman said. "It completely changes the workflow process. It's been challenging," he said.

But now the yield management software is pervasive in their daily routines. "Our customer service personnel use the product when they're soliciting loads or when a customer calls them to tender loads. They use the OptiYield-RT system to aid them in their decision-making process on

what freight to accept or reject, which customers, which lanes, etc.," Thurman said.

Initially, Sitton populated the yield management software with about a year's worth of data. As the company becomes more advanced with yield management, Thurman said, he hopes to start accounting for seasonal fluctuations.

Sitton expects to make its initial investment in the OptiYield software license — the cost of which is dependent on a fleet's size but starts at around \$100,000 — back within the year. That should be par for the course for most companies investing in the technology, said Fontanella. "Just bringing planning from an Excel spreadsheet to software-based factory planning is a huge benefit," he said.

Gallego predicts that yield management could become commonplace in other industries soon — for the Dells and Gateways of the world. "Computers have a short life cycle, and so you want to get rid of a certain number of units in a

reasonable time frame," he said. "But I think right now the big potential still remains in retailing."

By using yield management, retailers can divine the optimum time to release a product,

the best price to charge and the date on which it should be discounted, with the result that they can sell the maximum quantity of product at the greatest gross revenue. "Retailers could be using yield management much more aggressively," said Gallego. "Federated [Department Stores Inc.] started doing something, but when they acquired Macy's [in 1994], the impetus waned because their databases had a hard time talking to each other."

Experts caution that not everyone will buy in overnight, at least in the trucking industry. Until then, Sitton Motor Lines hopes to savor its lead. "It's very early in the process for us," Thurman said, "but we think there's enormous potential with yield management to improve our profit margins and gain competitive advantage."

AT A GLANCE

Keep on Truckin'

Company: Sitton Motor Lines Inc., Joplin, Mo.

Fleet: 600 trucks and 1,200 dry-van trailers

What they're doing: Using Sabre's OptiYield-RT yield management product to maximize revenue by keeping trucks full at the highest available rate

SNAPSHOT

Year 2000 Travel Readiness

RED (SERIOUS RISK OF DISRUPTION)

- Czech Republic
- Hungary
- Russia
- Italy
- Spain
- Finland
- Poland
- Switzerland
- Germany
- Portugal

YELLOW (RISK OF DISRUPTION)

- Australia
- Greece
- Netherlands
- Austria
- Iceland
- New Zealand
- Belgium
- India
- South Africa
- Canada
- Ireland
- Turkey
- France
- Japan

GREEN (LOW RISK OF DISRUPTION)

- China
- Hong Kong
- United Kingdom
- Denmark
- Israel
- Sweden
- Egypt

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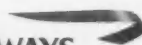
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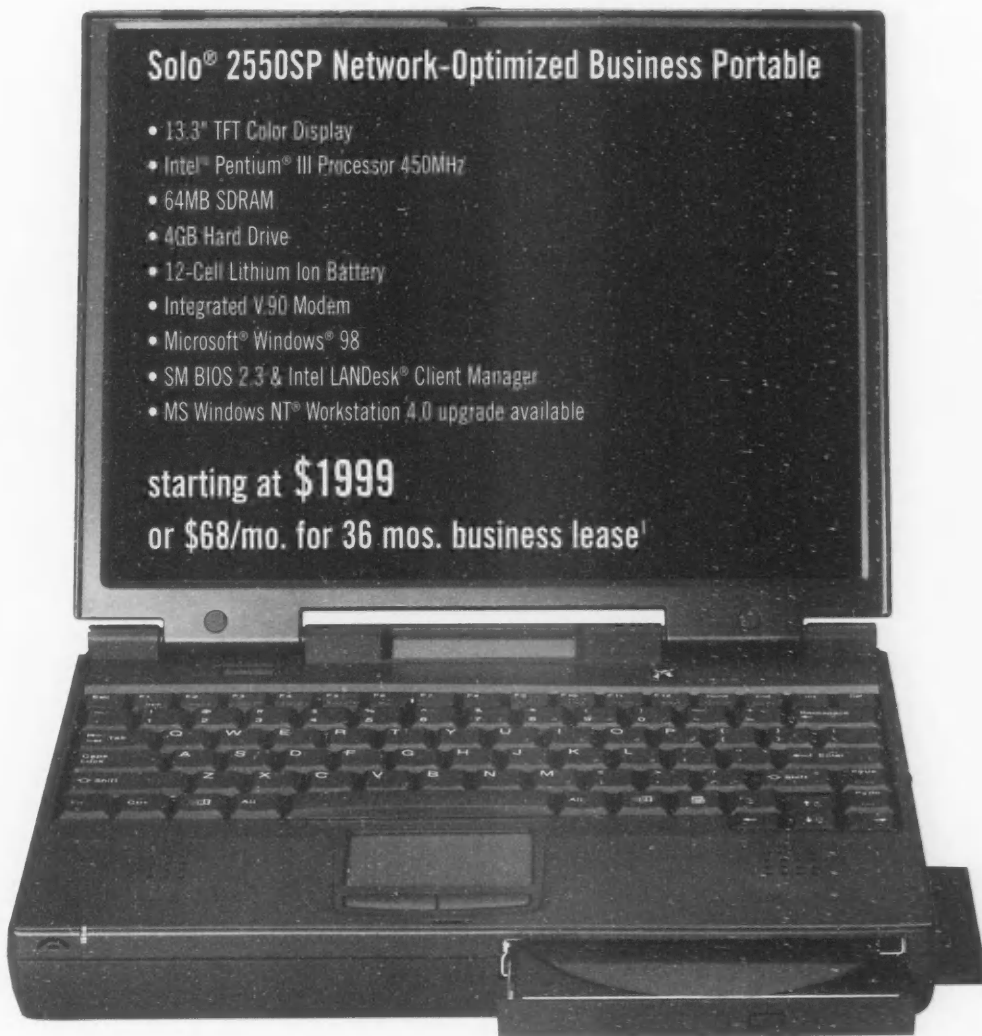
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Lawyer Promotes Y2K Cost Recovery Tactic

Many doubt third-party liability argument will fly

BY THOMAS HOFFMAN

A LOS ANGELES attorney is promoting a new approach that companies can use to try to get insurance firms to reimburse their year 2000 remediation costs.

The idea, proposed by attorney Linda Kornfeld, is for companies to make use of their third-party comprehensive general liability (CGL) coverage. This type of insurance has been used to cover the costs of preventive steps taken by companies to ward off damages or harm to other people or businesses.

For example, in a 1988 case involving Intel Corp. and the Hartford Accident and Indemnity Co., a California court

ruled that the costs of cleaning up hazardous waste at an Intel plant were covered under its CGL insurance because the chemicals could have infiltrated groundwater supplies and potentially harmed people who live in the area.

Because companies are so "interdependent" on one another's computer systems to function properly, argues Kornfeld, "if your company's computer systems go down on Jan. 1, that could impact other companies."

Because businesses are making Y2K-related repairs to their systems to prevent damages to third parties and property, then "you're essentially saving money for the insurance companies" by taking proactive steps to avoid lawsuits,

said Kornfeld, who works at Troop Steuber Pasich Reddick & Tobey LLP.

However, several lawyers and insurance industry experts said they don't believe that CGL insurance can be applied to recovering year 2000 costs.

The CGL approach "certainly shows some creative thinking," said Doug Ey, a lawyer at Smith Helms Mullin & Moore. The Charlotte, N.C.-based law firm is representing an insurance company that has been sued over a separate Y2K-related claim under a suit that's tied to the "sue-and-labor" clause of an insurance policy.

Earlier this summer, companies such as GTE Corp. and Xerox Corp. filed lawsuits against their insurers to recoup their Y2K remediation costs, but the cases haven't been heard yet.

Under the sue-and-labor clauses of their property insurance policies, GTE and Xerox are filing claims to retrieve costs used to protect property in the face of imminent danger [News, July 26]. The sue-and-labor clause isn't the same approach as the CGL tactic, though they both are aimed at recouping Y2K costs through insurance coverage.

In the environmental cases Kornfeld cites, where CGL insurance covered work done, government agencies stepped in and forced companies to clean up their chemical spills, said Ey. Plus, the courts "weren't universal" in supporting all CGL claims, Ey said.

"You buy insurance to protect against fortuitous events, not to pay for your day-to-day maintenance activities," he added.

Others agreed. "If a business has someone shovel snow from their sidewalk to prevent someone from slipping

and getting hurt, those costs have never been classified to be covered under the 'preserve-and-protect' portion" of CGL policies, said Martin Sheffield, a vice president at A.M. Best Co., an Oldwick, N.J.-based firm that provides ratings and other information on insurance companies.

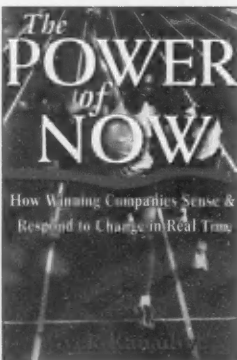
The CGL approach to recouping Y2K costs "faces a huge uphill fight" and "is not very realistic," said Dean Morehaus, an attorney at Thelen Reid & Priest LLP in San Francisco.

Still, not all legal experts dismiss the CGL approach. The tactic "does have legs, and we have considered" applying it to recover Y2K costs, said Andrew Reidy, a partner at McKenna & Cuneo LLP in Washington. Reidy is representing Unisys Corp. in a sue-and-labor-type Y2K lawsuit the Blue Bell, Pa.-based information services vendor filed against an insurance company in Delaware Superior Court in August. ■



ATTORNEY DEAN MOREHAUS: Tactic "not very realistic"

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Special Projects Get Outsourced

BY JULEKHA DASH

Some four in 10 large companies outsource short-term projects, largely due to scarce IT labor, but also because of budget and management concerns, according to a survey released last week.

Arlington, Mass.-based Cutter Consortium, the information technology market research firm that is conducting the ongoing survey, said 40% of the 154 responses have reported outsourcing special projects.

Cutter defined special projects as those that are relatively short term and don't require ongoing maintenance.

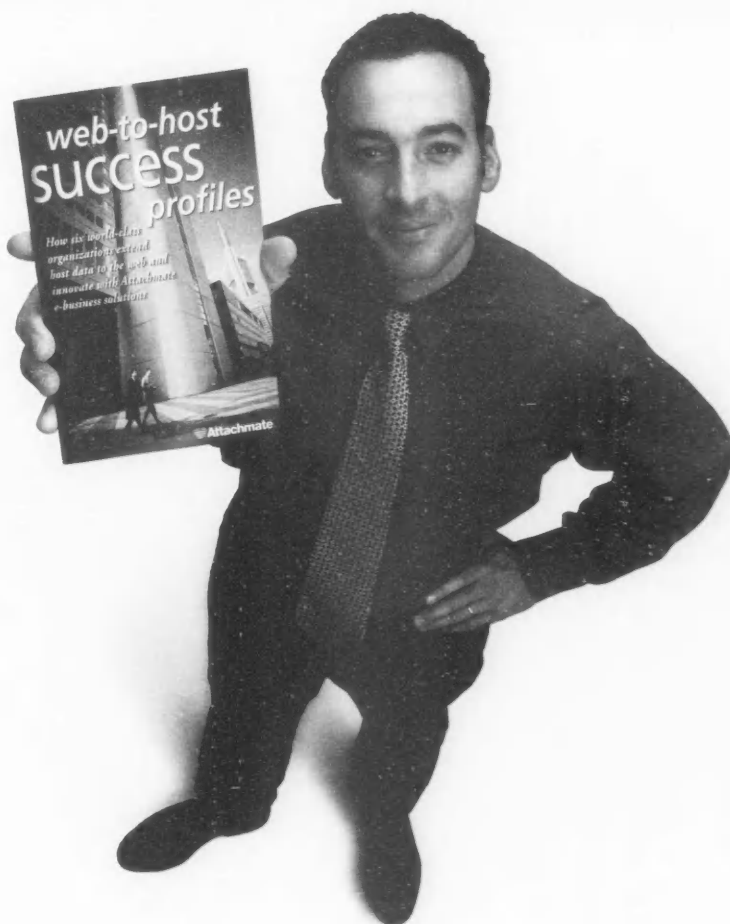
Analysts said Y2K and e-commerce projects are among the most common special projects outsourced. Most survey respondents were large companies, with an average of \$3.2 billion in annual revenue.

Cutter senior analyst Sheila Green said companies outsource projects

when they need expertise in particular skills — such as figuring a distributing computing architecture — or need to get a project up and running quickly. That's often the case for many e-commerce projects. Green said she wasn't surprised by the survey results. "Companies need more contract personnel as the complexity of their work increases," she said.

Amy Ryberg, president of Ingredients.com, an online supplier of skin and bath care products in New York, outsourced a special project: developing its Web site. It had a short window to launch its Web site — between June when it received its first round of financing and the busy holiday season. The site went live Oct. 28.

Albert Nekimken, a senior analyst at Input, an IT research firm in Vienna, Va., said companies choose to outsource special projects because if "they use their own people, then daily management gets neglected." According to Input, by next year roughly 75% of companies are expected to employ some type of IT outsourcing to remain competitive or add to the resources and skills in their existing IT departments. ■



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DR. SHAHLA BUTLER

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For example, her team's initial XML research yielded an intelligent agent that collects relevant information across multiple sources then synthesizes, categorizes and disseminates it based on a user's specified interests. "Our Next Generation Enterprise and Business Intelligence & Knowledge Management labs are collaborating now to evaluate emerging non-numeric mining tools," she proudly reports. "We'll be releasing the results soon."

And where does Dr. Butler gain her understanding of emerging technologies? From her peers, at conferences, from the Web and from *Computerworld*. The Newspaper for IT Leaders.



CHANNELS

COMPUTERWORLD
THE NEWSPAPER FOR IT LEADERS

Sears Spins Off HomeLife Division

Company building IT systems from scratch

BY JAIKUMAR VIJAYAN

IMAGINE SCRAPPING all of your systems and starting over. That's what HomeLife Inc. gets to do as a result of its divestiture from Sears, Roebuck and Co.

Hoffman Estates, Ill.-based HomeLife started as a furniture division of Sears in 1992 but is in the process of being spun off as an independent company. Sears announced its decision to spin off HomeLife as part of a move to concentrate instead on its core retail business.

HomeLife is taking the opportunity to design a far more business-specific application architecture compared with what it had used as a Sears business unit. The primary focus of the new architecture will be to improve the flow of information for the 2,500 users at HomeLife and its 140 retail locations and suppliers.

The idea is to take HomeLife closer to a "dynamic inventory" model, "which puts merchandise in the right place at just the right time," said HomeLife CIO Christopher Smith.

"It's a wonderful place for a

CIO to be in," said Jonathan Eunice, an analyst at Illuminata Inc. in Nashua, N.H. Unburdened by legacy application migration issues, "it is an opportunity to bring in the latest and the greatest technologies."

A major focus of the new architecture will be "adding functionality in two primary areas — a store point-of-sale [system] targeted for furniture retail... and a more sophisticated supply-chain management process," Smith said.

Core features of the system will be an intranet linking HomeLife's headquarters and retail locations. The network will allow stores and vendors to communicate with one another

over the Internet and have browser-based access to information such as order tracking, promotions and pricing.

A business-to-business extranet linking HomeLife's various furniture suppliers will provide similar collaboration capabilities for them.

The fully integrated, real-time transaction-processing

environment will provide instant access to order information, inventory, sales and store performance across the chain. Providing the underlying software architecture is database technology from Oracle Corp. and a specialized retail application suite from San Diego-based GERS Inc. The range of capabilities delivered by the GERS software include the abilities to perform trend analysis, such as analyzing shrinking margins in a merchandise classification, and to provide a global server for price lookup and customer layaway databases.

BDO Siedman LLP, a Chicago-based accounting and technology consulting firm, is helping HomeLife on the project management side — which, according to Smith, poses the biggest challenge.

Handling the integration on the technology front is Westboro, Mass.-based Data General Corp. ▀

Tech Picks

A sample of the technology powering HomeLife's new IT infrastructure:

Hardware: Two AV 25000 Data General NUMA Unix servers — a 24-processor system with 24G bytes for the main retail application and one eight-processor server with 8G bytes of memory as a hot-standby

Software: Retail application suite from GERS Inc.

Database technology: Oracle

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Restaurant Chain Finds Cost-Saving Recipe

BY SAMI LAIS
DALLAS

Red Robin International Inc. in Englewood, Colo., has picked up an award for a system that automates data flow and reporting. The system has saved the restaurant chain more than \$300,000 — even though it's not finished.

The award, presented by the sponsors of the FS/Tec annual food service and technology conference this month, was for automated data flow. The changes have vastly improved the information Red Robin uses to plan inventory and sales, company spokesmen said.

The improvements came under unlikely circumstances. During the past two years, the chain came under new management and moved from

Seattle to Englewood, losing most of its information technology department in the process.

Its systems were so kludgy that the new three-person IT department sometimes spent all day doing SQL queries for a single operational or financial report for one user, said Howard Jenkins, vice president of MIS at Red Robin. "And people still didn't know sales results from [changes in] menu placement of items or promotions — and we do tons of promotions — or food costs."

With the move from the older AS/400 systems to Windows NT still in early stages, the rest of the systems weren't in much better shape, added Rob Jakoby, Red Robin's director of restaurant systems.

Red Robin had bought food-

and labor-tracking software from Huntington Beach, Calif.-based MenuLink Computer Solutions Inc. to run on cash registers, collecting data to populate a proposed data warehouse. The software was a bust, though.

"In fact, I was hired to take us off the AS/400s and get rid of MenuLink," Jakoby said. But similar software from other vendors was still in 1.0 versions for Windows NT. "It was all new code, and we didn't want to use it." He said that after talking to MenuLink, he suspected the software wasn't at fault.

To estimate costs, MenuLink depends on accurate measuring of recipes and preparation time. Recipes must correctly reflect the amount of food actually used, for the purposes of

both setting menu prices and reordering food, an automatic process built in to MenuLink. "We fixed the recipes and found the software did work," Jakoby said.

Cutting food costs by as little as 1% can save hundreds of thousands of dollars, even for a midsize chain such as Red Robin, which has 146 restaurants, said A. Joseph Pava Jr., an analyst at CynterCon Inc., a consultancy in Gaithersburg, Md.

Pays for Itself

The rest of the system was an easy sell, Jenkins said.

The company installed reporting and online analytical processing tools from Burlington, Mass.-based Cognos Corp. to let users create their own reports.

"[End users] went bug-eyed," Jenkins said. "As soon as they realized they could get all this data without having to

deal with large SQL scripts, we had 'em."

Before buying Cognos, the company priced a few others, including Red Brick Warehouse from Informix Corp. in Menlo Park, Calif., Jakoby said. But the Cognos software did the job for a fee that "saved a couple of zeroes on the price," he said.

"But the beaker incident was the capper," Jakoby said. The store ran a promotion for beakers of an alcoholic beverage. After a week, sales were double what was expected, and Red Robin ordered \$250,000 worth of additional beakers.

But when the purchasing department ran a report, it found that stores had started the promotion a week early, so sales figures were based on two weeks, not one. The department canceled the order.

The system "paid for itself four times over right there," Jakoby said. ■


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WORKSTYLES

Job Board 'Black Hole'

Remember the Monster.com television ads that debuted during last season's Super Bowl? Kids with serious faces listed their "when I grow up" ambitions. But in place of job titles like fireman or doctor, the kids mouthed Dilbert-like phrases such as "I want to be a yes-man" or "I want to climb my way up to middle management."

The commercials worked for the Maynard, Mass.-based company, which had more than 2 million job searches conducted at its Web site within 24 hours of the game. Some job hunters — including information technology workers — reported less than impressive results from posting their résumés on such Web sites.

Forty percent of job seekers said that posting a résumé online is the equivalent of sending it into a black hole, according to a survey released in early November. About one-third of the respondents said they found it difficult to follow up with a company after posting their résumés online. And more than two-thirds said they don't always find jobs for which they are qualified.

Kforce.com, an online recruiting and career management service and a division of Romac International Inc. in Tampa, Fla., commissioned the survey of 1,000 individuals.

Jim Barr, a Y2K contingency planner at a financial services firm in Parsippany, N.J., said he agreed with survey respondents that *black hole* was an apt term to describe his experience. "I don't even put my résumé online anymore."

Stephanie Johns, a contractor and Advanced Business

Application Programming programmer who lives in Tampa, said she agreed that following up with a company once she has posted a résumé can be difficult. "Unless [I'm] persistent with the contact person, it's tough to get information on whether my résumé is applicable for a job."

Howard Rubin, a research fellow at Meta Group Inc. in Stamford, Conn., said IT recruiting managers at big firms still rely primarily on people they know — such as headhunters — to find qualified candidates.

According to a survey conducted by International Data Corp., in Framingham, Mass., the biggest source of IT recruitment for companies of various sizes is employee referrals, which account for about 25% of recruiting vs. 8% for online.

But recruiting sites can be rewarding if your search is more focused. Johns, for instance, found that it was time-consuming to hunt for positions at individual sites. However, she recently found a 10-month contract position at Tampa Electric by using Upseek.com, which scours the various job boards.

IT contractors may find that a Web site's auctioning service can produce faster results. Barr has used Monster.com's Talent Market, where contractors name their price. With Talent Market, contractors fill out a thumbnail profile of themselves, which includes their skills, pay rate and availability. "By having the availability information, an employer knows he or she is looking at something current and active," said Barr.

—Julekha Dash

How Do IT Recruiters Hire?

Employers use the following sources to find workers:

Employee referral	25.2%
Print media (newspaper, magazine ad)	16.1%
Unsolicited contact (mail, phone)	9.7%
Recruiting event (job fairs)	9.5%
Third-party firm (search agency)	8.2%
Paid Internet recruiting service	8.2%
College recruiting	7.6%
Company's Web site	7.6%
Other	7.9%

Base: 72 responses on 6,000 hires

SOURCE: MICHAEL BOND INTERNATIONAL DATA CORP., FRAMINGHAM
COMPUTERWORLD SURVEY

ED YOURDON

Y2K whistle-blowers

THE AMOUNT OF E-MAIL I receive from would-be Y2K whistle-blowers has increased recently, and I suspect the trend will continue as we approach the big day. Regardless of your opinion of the individuals involved, you should consider how to handle whistle-blowers in year 2000 contingency planning and corporate communications efforts.

Suppose, for example, that an employee posts a corporate Y2K status report, replete with gloomy information about noncompliant

mission-critical systems, on the Web. And suppose that in a fit of moral outrage over a blatantly false public relations report about the company's Y2K status, he sends a copy of the real status report to every major newspaper in the country. How would your organization respond? And equally important, how quickly could it respond? Most Y2K whistle-blowers are IT professionals, and they're often members of an organization's Y2K team. Some of the ones who contact me are managers, though rarely at the vice president level and never at the CIO level. But the IT whistle-blowers clearly understand software and systems, and they usually have direct access to substantive information about the organization's Y2K status and progress — or at least the status of the particular systems they're involved with.

Other whistle-blowers are administrative or clerical people, often with years of end-user experience with the organization's systems. Sometimes their information is firsthand, substantive and credible; sometimes it's secondhand, gossip or unsubstantiated conversations with their supervisor down at the local pub.

There's also a third category: individuals whose friends or relatives have communicated disturbing Y2K news — for example, rumors from someone's brother-in-law that highways will be blockaded by armed troops on New Year's Eve to keep people from leaving the cities. Such stories are unlikely to be taken seriously.

Judging from the e-mail I've received, IT professionals are the most likely to have credible information. Their motivation varies, though it's rarely associated with feelings of revenge. It's also worth noting that I haven't heard from anyone intending to use negative Y2K information for extortion or blackmail and that the hackers and terrorists of the world haven't bothered sharing their plans with me. The overwhelming majority of whistle-blowers are motivated by a sense of ethics — for example, they know that

remediation of system X hasn't even begun, and they're outraged by a public speech from the CEO saying that X is 100% compliant. Some of the whistle-blowers seem genuinely concerned about the economic consequences or public safety risks associated with their company's Y2K problems. And some are simply disgusted at seeing yet another IT project run into serious trouble by what they perceive as management incompetence.

Many organizations have prevented whistle-blower incidents by depending on professional behavior and a sense of loyalty from their employees and by emphasizing that unauthorized Y2K disclosures are grounds for instant termina-

tion. But I think one reason that this approach has succeeded is that many IT professionals sincerely believed their companies would succeed in their Y2K efforts. Now that we're down to the final weeks of 1999, some individuals have concluded that (a) there's no chance of their company succeeding, and (b) their superiors are aware of the imminent failure but misrepresent the situation in their public statements. And with those types of attitudes, loyalty and fear of being fired may no longer keep them quiet — after all, if you believe your company is going bankrupt in a month regardless of what you do, what do you have to lose?

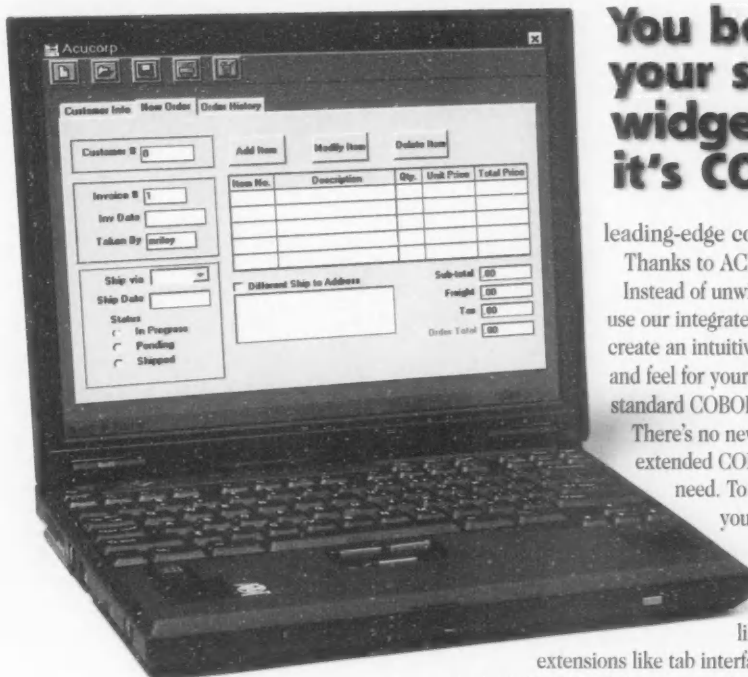
How to respond to the whistle-blowers and the information they disclose is a sensitive and controversial topic on its own. Every company will have to determine its own policies and procedures, but the time to do so is before a whistle-blower episode, not after. And the key point to remember is that the absence of any such incidents in the past is no guarantee that you'll avoid them in the last few weeks of 1999. ■

Yourdon heads the year 2000 service at Cutter Consortium in Arlington, Mass. Contact him at www.yourdon.com.

How would
your organization
respond?



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Wanted: Experienced anybody

BY BRONWYN FRYER

David Westmoreland's got a big problem with Java. He can't find people who know the language. When he does, he doesn't want to hire them. "Everybody's saying Java's the solution to world hunger, but nobody who knows it has any experience," he says.

Westmoreland's problem is exacerbated by the fact that he runs a huge information technology department in a company with big e-commerce ambitions. As vice president and CIO at \$8.5 billion Arrow Electronics Inc., a 10,000-employee company in Melville, N.Y., he's responsible for the daily doings of 375 technology professionals, all of whom are already busy. Like everyone else, Arrow next year will be pushing hard to build up its portfolio of intranet and extranet applications.

Unimpressed with the quality of wet-behind-the-ears Java programmers he's interviewed for jobs, Westmoreland is looking inward, training existing staff to learn the language. "We're sending more and more people to Java training school so that we can begin developing our e-commerce and intranet applications," he says.

Westmoreland's conundrum is widespread. Next year, folks with Web skills will be at the top of the hiring list. As companies wind up their Y2K projects, they will begin to focus their energies on building Internet- and intranet-based applications. But "most organiza-

tions are reluctant to go with start-up people," observes Mike Sheak, vice president of IT resources at Kelly Services Inc. in Troy, Mich.

Training seems to be the answer. According to the 1999 *Computerworld* Skills Survey, 34% of IT managers plan to pump training dollars into building Java skills, 39% are investing in the Web programming language HTML and 18% are investing in C++ training.

The ongoing Web explosion is placing IT professionals with knowledge of just about anything having to do with e-commerce in high demand. But good folks are hard to find. "We're noticing a very high demand right now for experienced C++ and Java developers," says Jesse Pavony, a technical recruiter at the Toronto office of Pencom Systems Inc. "But companies are really looking for people who understand object-

oriented design and analysis as part of a methodology."

Unfortunately, IT managers say, there simply aren't enough people who can put together a Web page, engineer a network, build an Oracle database and speak English, too. "I don't think IT people are particularly savvy communicators," says John Keast, CIO at Pacific Gas & Electric Co. in San Francisco. "Our big problem is finding people who have a business understanding, who can see outside the box and see how to use technology to the organization's advantage."

Like Westmoreland, Keast is looking at training people who are already on staff, but he's eyeing business areas within his company as a possible source of recruits. "I don't mind hiring a smart businessperson who likes technology enough to know how to put in a new sound card and training them in the IT skills they need," he says.

Indeed, smart business generalists who like to fiddle with technology can become prime movers in an IT organization. Consider the case of Gary Lagarde, a onetime liberal arts major who today works as a senior technologist in the computing services group at Reynolds Metals Co. in Richmond, Va. Prior to working at Reynolds, Lagarde was a sales and marketing representative at St. Louis-based Anheuser-Busch Inc. "I enjoyed working on technology," he says. When he came to Reynolds, he was trained for a position as an expert on the AS/400 platform. Today, he's considered

Skills Survey, page 66

COMPUTERWORLD'S
6th annual
**SKILLS
SURVEY**

Just Can't Get Enough

IT hiring managers report the following as the most difficult skills to find in the market:

SKILL	% REPORTING
Oracle	11%
Java	10%
Oracle DBMS	9%
Cobol	8%
Project management	6%
Unix	6%



DAVID WESTMORELAND at Arrow Electronics, frustrated by a lack of qualified Java developers, has decided to train his own staff instead of hiring outsiders

Fed up with job candidates who flaunt skills but have little to no experience, many IT managers are turning to training and internal hiring for their future skills needs

Continued from page 64
a key member of Reynolds' IT team.

"I want people with good project management and interpersonal communication and business knowledge.

We have to broaden our horizons, and we're happy to consider people with a good liberal arts and business background who have a good PC knowledge," says CIO John Rudio. To this end, Rudio has hooked up with the Virginia Federation of Independent Colleges, a consortium of 15 area liberal arts schools, to tap into an unexploited resource of liberal arts students with an interest in technology.

The e-commerce explosion is forcing companies to look high and low for networking professionals. This has been

the biggest challenge for Ron Porter, vice president of information systems at USA Federal Credit Union in Troy, Mich. "Good, experienced network designers are really hard to find," says

Porter. "Schools are churning out [Microsoft Certified Software Engineers] like rabbits, but they have no experience. And as soon as you hire someone who is, they quit because they find better jobs."

As was the case this year, anyone with network development skills next year could well see a big raise. Consider: 24% of skills survey respondents said they expect to hire people with experience in network protocols, particularly TCP/IP. And to rev up their Windows NT networks, 31% of survey re-

spondents said they expect to spend money on NT Server training.

Worth his or her weight in gold is the network architect who can understand the big picture. Companies in well-to-do cities like Boston are luring this person for all they're worth. "The Boston marketplace is very, very hot right now," says Kristi Hummel, a recruiting manager at Pencom's Boston office.

The need for network designers and developers, she says, is "growing exponentially," with top candidates receiving signing bonuses, stock options, retention bonuses and flexible work schedules, on top of an average salary.

The e-commerce craze is also pressing companies to pay more for those with a background in database skills, particularly Oracle. About 28% of man-

Skills Survey, page 68

COMPUTERWORLD'S 6th annual SKILLS SURVEY

How's a Recruiter To Find 'Em?

IT hiring managers and recruiters report the following as the most effective ways to recruit needed talent:

RECRUITING METHOD	% REPORTING
Placement and recruiting firms; headhunters	40%
Internet ads	18%
Referrals from peers, friends or industry contacts	17%
Train in-house employees; promote from within	16%
Newspaper or magazine ads	15%

Multiple responses allowed

The 'Most Wanted' Skills for Year 2000

For IT professionals and contractors looking to invest in training and skills development, consider where IT managers say they will be investing their training and hiring dollars:

INTERNET SKILLS	% COMPANIES WITH SKILL NOW	% COMPANIES TRAINING FOR NEXT YEAR	% COMPANIES HIRING FOR NEXT YEAR
Java	30%	34%	24%
HTML	54%	39%	18%
ActiveX	17%	14%	10%
Common Gateway Interface	16%	13%	6%
Netscape Server	13%	7%	3%
LANGUAGE SKILLS	% COMPANIES WITH SKILL NOW	% COMPANIES TRAINING FOR NEXT YEAR	% COMPANIES HIRING FOR NEXT YEAR
C++	38%	18%	18%
Cobol	40%	5%	17%
C	27%	6%	8%
Micro Focus Cobol	13%	2%	3%
Smalltalk	3%	1%	2%
DEVELOPMENT TOOLS SKILLS	% COMPANIES WITH SKILL NOW	% COMPANIES TRAINING FOR NEXT YEAR	% COMPANIES HIRING FOR NEXT YEAR
Microsoft Visual Basic	38%	21%	16%
Oracle Developer 2000	19%	13%	14%
Visual C++	22%	14%	13%
Visual J++	8%	9%	7%
PowerBuilder	12%	8%	5%
NETWORKING SKILLS	% COMPANIES WITH SKILL NOW	% COMPANIES TRAINING FOR NEXT YEAR	% COMPANIES HIRING FOR NEXT YEAR
TCP/IP	77%	31%	24%
IPX	29%	7%	5%
SNA	19%	3%	5%
WAN-wise	8%	6%	4%
LU6.2	8%	2%	2%
DBMS AND ROBSM SKILLS	% COMPANIES WITH SKILL NOW	% COMPANIES TRAINING FOR NEXT YEAR	% COMPANIES HIRING FOR NEXT YEAR
Oracle	33%	25%	28%
Microsoft SQL Server	36%	23%	14%
DB2	23%	10%	10%
Sybase SQL Server	13%	5%	4%
Object databases	5%	5%	3%

OPERATING SYSTEM SKILLS	% COMPANIES WITH SKILL NOW	% COMPANIES TRAINING FOR NEXT YEAR	% COMPANIES HIRING FOR NEXT YEAR
Windows NT	81%	35%	28%
Windows 95	79%	10%	12%
Solaris	18%	9%	11%
Unix	19%	6%	7%
Linux	19%	10%	5%
INTERNETWORKING SKILLS	% COMPANIES WITH SKILL NOW	% COMPANIES TRAINING FOR NEXT YEAR	% COMPANIES HIRING FOR NEXT YEAR
Ethernet switching	42%	13%	7%
10Base-T switching	40%	13%	7%
Routing	37%	12%	5%
Asynchronous Transfer Mode	11%	3%	5%
Gigabit Ethernet	14%	10%	3%
LAN SKILLS	% COMPANIES WITH SKILL NOW	% COMPANIES TRAINING FOR NEXT YEAR	% COMPANIES HIRING FOR NEXT YEAR
Windows NT Server	62%	31%	17%
Novell NetWare	42%	12%	8%
Ethernet	50%	14%	4%
HTTP	23%	7%	3%
AppleTalk	10%	2%	1%
OFFICE/E-MAIL GROUPWARE SKILLS	% COMPANIES WITH SKILL NOW	% COMPANIES TRAINING FOR NEXT YEAR	% COMPANIES HIRING FOR NEXT YEAR
Lotus Notes	23%	14%	14%
Microsoft Exchange	43%	19%	10%
Novell GroupWise	12%	5%	2%
CC-Mail	13%	2%	1%
CLIENT/SERVER APPLICATION SKILLS	% COMPANIES WITH SKILL NOW	% COMPANIES TRAINING FOR NEXT YEAR	% COMPANIES HIRING FOR NEXT YEAR
Oracle	21%	14%	19%
PeopleSoft	7%	8%	8%
SAP	5%	4%	6%
Lawson	4%	2%	2%
J. D. Edwards	4%	2%	1%
CLIENT/SERVER APPLICATION SKILLS	% COMPANIES WITH SKILL NOW	% COMPANIES TRAINING FOR NEXT YEAR	% COMPANIES HIRING FOR NEXT YEAR
Internet app. development	34%	24%	27%
Data warehousing/mining	22%	17%	15%
E-commerce app. dev.	20%	18%	15%
Project management	41%	16%	14%
Help desk	43%	17%	13%

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agers are looking to hire Oracle professionals, either for database or client/server applications, next year. "We're having trouble hiring solid [database administrators] that can work on teams," says Westmoreland, emphasizing that "people who can look at the bigger business picture" are critical. "We've filled the gap by hiring consultants," he says.

Almost universally, companies predict a diminishing need for Cobol cowboys. While 17% of companies say they will hire Cobol programmers to babysit their mainframes, almost no training dollars are being put into this area.

Certainly, mainframe systems won't go away; after all, they're fantastic e-commerce transaction processors. "Our mainframe scales like no other platform, and I'm very happy with it," says Westmoreland.

Nevertheless, Cobol programmers had better not sit on their hands if they want to keep working. "With the Y2K problem area resolved, many Cobol programmers are going to see their high-priced contracts and projects cut with virtually no companies willing to pick them up," says Hummel.

What's a Cobol speaker to do? "Re-training in newer technologies is going to be very important for this group," says

Hummel. But others who've toiled to quash Y2K may be sitting pretty, as 14% of managers will be offering training in the big picture: project management.

External consultants who specialize in project management will continue to do well, too. "We have a perpetual need for consultants who understand project life cycles in the development realm but who can also communicate effectively to all levels of management," says Pavony. "People with those hard-to-find skills can pretty much write their own check."

Beyond 2000, companies will still need to beat the bushes for people with networking, database and Web-building skills, but they'll also be on the hunt for those with telephony skills such as voice-

over-IP, says Marc Salvati, a recruiting director in Pencom's Toronto office.

In the meantime, IT managers should begin to think outside the box, as Keast says, in their search for people who can make a real difference in the organization. And the only way to do that, it seems, is to keep training.

As Harry Singh, director of customer services, support and training at Xerox Corp. in Palo Alto, Calif., puts it: "Training is becoming more important than most corporations care to believe." After all, says Singh, "better-trained people produce code better and faster." ▀

Fryer is a freelance writer in Santa Cruz, Calif.

COMPUTERWORLD'S 6th annual SKILLS SURVEY

Cashing In on the Top-Paying Skills

IT managers say they're paying the following salary premiums (amount above the normal salary for that job) for skills in demand:

INTERNET SKILLS	% OF SALARY PREMIUM PAID TO STAFFERS	% OF SALARY PREMIUM PAID TO CONTRACTORS AND CONSULTANTS
Java	9%	16%
ActiveX	7%	7%
HTML	6%	5%
CGI	4%	6%
Netscape Server	4%	4%
LANGUAGE SKILLS	% OF SALARY PREMIUM PAID TO STAFFERS	% OF SALARY PREMIUM PAID TO CONTRACTORS AND CONSULTANTS
C++	8%	13%
C	5%	11%
Cobol	5%	3%
MicroFocus Cobol	4%	6%
Smalltalk	2%	2%
DEVELOPMENT TOOLS SKILLS	% OF SALARY PREMIUM PAID TO STAFFERS	% OF SALARY PREMIUM PAID TO CONTRACTORS AND CONSULTANTS
Oracle Developer 2000	10%	23%
Visual C++	10%	17%
Inprise (Borland) Delphi	8%	20%
Visual J++	8%	11%
PowerBuilder	8%	10%
NETWORKING SKILLS	% OF SALARY PREMIUM PAID TO STAFFERS	% OF SALARY PREMIUM PAID TO CONTRACTORS AND CONSULTANTS
WAN-wise	11%	6%
APPC	9%	1%
TCP/IP	7%	11%
IPX	5%	7%
SNA	5%	6%
DBMS AND RDBMS SKILLS	% OF SALARY PREMIUM PAID TO STAFFERS	% OF SALARY PREMIUM PAID TO CONTRACTORS AND CONSULTANTS
Oracle	13%	22%
Object databases	12%	8%
DB2	9%	10%
Microsoft SQL Server	6%	13%
dbase/xbase	6%	13%

OPERATING SYSTEM SKILLS	% OF SALARY PREMIUM PAID TO STAFFERS	% OF SALARY PREMIUM PAID TO CONTRACTORS AND CONSULTANTS
Solaris	7%	16%
Linux	7%	8%
DOS	7%	5%
Windows 95	7%	4%
Unix	6%	9%
INTERNETWORKING SKILLS	% OF SALARY PREMIUM PAID TO STAFFERS	% OF SALARY PREMIUM PAID TO CONTRACTORS AND CONSULTANTS
Ethernet switching	8%	8%
10Base-T switching	7%	11%
Routing	7%	11%
ATM	6%	19%
Gigabit Ethernet	3%	4%
LAN SKILLS	% OF SALARY PREMIUM PAID TO STAFFERS	% OF SALARY PREMIUM PAID TO CONTRACTORS AND CONSULTANTS
HTTP	8%	10%
Windows NT Server	6%	7%
Ethernet	6%	7%
Novell NetWare	5%	7%
AppleTalk	2%	4%
OFFICE/E-MAIL GROUPWARE SKILLS	% OF SALARY PREMIUM PAID TO STAFFERS	% OF SALARY PREMIUM PAID TO CONTRACTORS AND CONSULTANTS
Lotus Notes	9%	21%
Microsoft Exchange	8%	5%
Novell GroupWise	5%	NA
CC-Mail	4%	1%
CLIENT/SERVER APPLICATION SKILLS	% OF SALARY PREMIUM PAID TO STAFFERS	% OF SALARY PREMIUM PAID TO CONTRACTORS AND CONSULTANTS
Lawson	17%	14%
PeopleSoft	16%	21%
J. D. Edwards	14%	48%
Oracle	11%	22%
SAP	8%	22%
SYSTEMS SOFTWARE AND SUPPORT SKILLS	% OF SALARY PREMIUM PAID TO STAFFERS	% OF SALARY PREMIUM PAID TO CONTRACTORS AND CONSULTANTS
E-commerce app. development	10%	18%
Internet application development	9%	13%
Data warehousing/mining	9%	10%
Customer relations management	9%	10%
ERP	8%	17%

Skills Survey Methodology: In September 1999, Computerworld mailed its 6th Annual Skills survey to 5,000 IT professionals across the U.S. We asked them what skills their IT organization currently has, the average salary premium paid to individuals with these skills, as well as their training and hiring intentions for the particular skills. Our survey collected this information on 98 skills. The information shown here represents the responses of 365 IT professionals.

Q

GEE. IF IBM MERGED WITH SUN, THEY'D STILL BE #2.

Hmm. More businesses run Web servers from Compaq than from the two biggest talkers in the industry combined. That's approximately one-third of the entire Internet.

And it's so many, according to the newest data from InfoReads.com, the real battle is no longer for supremacy, but who can emerge in the #2 spot. Maybe there's a connection. Maybe the real conclusion

to be drawn is that whatever e-challenge you take on, chances are there's a Compaq server handling it gracefully already. Do they give out ribbons for that sort of thing? For more, visit www.compaq.com/NonStop.



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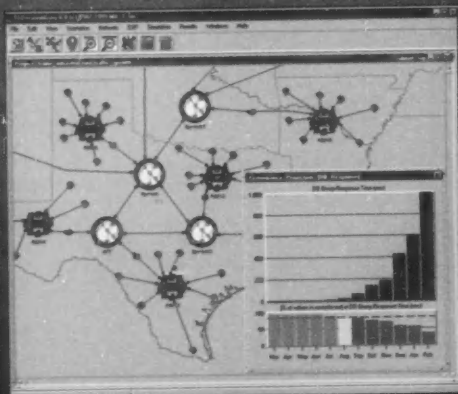


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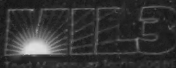
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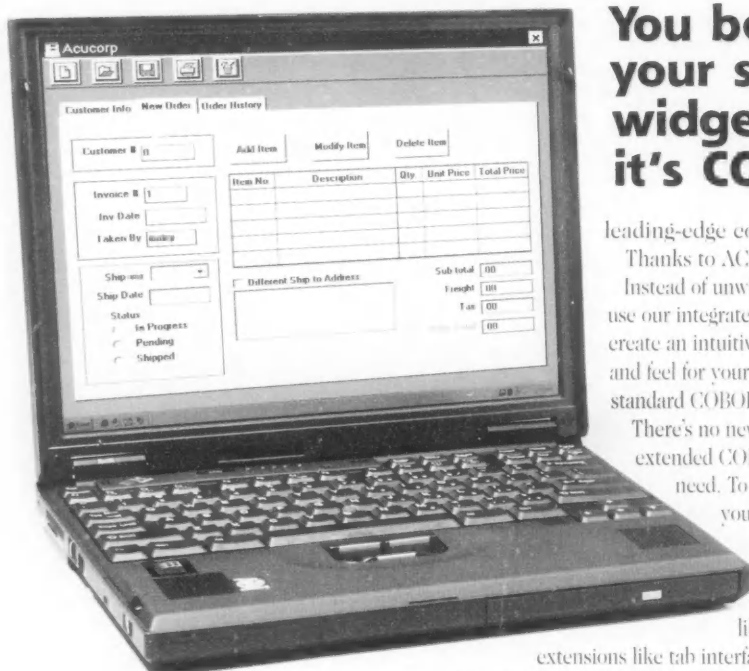
AN EDITORIAL SUPPLEMENT TO:

COMPUTERWORLD

EMERGING COMPANIES 2000

100 COMPANIES TO WATCH

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EMERGING COMPANIES 2000

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From the Editors:

Imagine your data center with only tried-and-true technology, only products that have stood the test of time and that no one would fault you for running in your data center.

Pretty dull place, huh?

But you can't populate your network with every gee-whiz gadget and program that gets tongues wagging in the trendiest Internet chat rooms. You have a business to run. So, what's your choice? A judicious balance, of course. One we hope the following pages will help you achieve, while not cutting yourself on the bleeding edge.

It's hard to sort through the mass of start-ups out there and to know which companies are hot in which technology areas. So to help you out, we created our Emerging Companies 2000 list: 100 start-ups worth watching. We turned to a panel of experts and asked them to help us compile a list.

We broke our list into 10 technology categories: application development, business process automation, consulting and services, customer care and supply-chain management, e-commerce, information and knowledge management, network and communications management, system management and security, Web applications and Web infrastructure.

Acknowledging that working with these companies isn't a matter of simply picking companies off our list, calling them up, buying a product and painlessly enjoying the benefits of a hot new technology, we've accompanied our list with some practical-advice articles. The articles will help you evaluate these firms and get the most from your choice after you sign on the dotted line.

Although we'd love to give you a guarantee with our list, we can't. All we can do is wish you the best of luck and the greatest success when you work with emerging companies and advise you to keep expectations in perspective. Working with emerging companies requires some patience on your end, but we believe that when you find the right fit, the pain you went through to get there will be well worth it.

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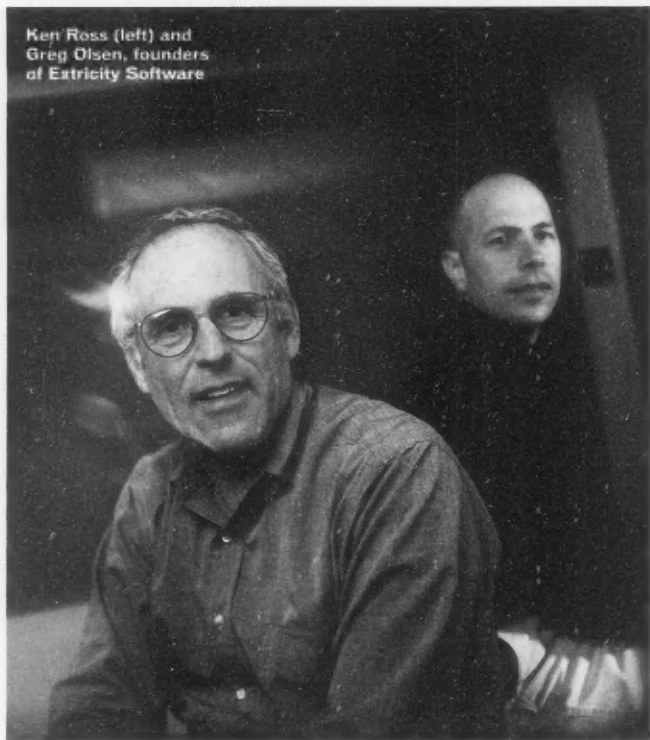
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Some IT folks share the types of products they would like to see come out of new firms.

Ken Ross (left) and
Greg Olsen, founders
of Extricity Software



The Internet Rules The Market

► Emerging companies are popping up all over the place, and whether in the networking or systems management space, they all have more than a little to do with Internet commerce

// By Sharon Watson

Ask venture capitalists and analysts what technologies are hot, and you'll get answers ranging from 3-D modeling and voice recognition to virtual marketplaces for raw materials and automated supply-chain management. And almost all of them will mention these disparate technologies and their suppliers under the rubric of "Internet commerce."

"I track 500 companies in 40 sectors and absolutely everything falls into e-commerce," says Jack Staff, chief Internet economist at Zona Research Inc. in Redwood City, Calif.

Investment research firm VentureOne Corp. in San Francisco recorded \$11.4 billion of venture capital invested during the first half of 1999, with Internet-related companies receiving \$5.91 billion of that.

Among Internet-related companies, business services — which VentureOne defines as Web-hosted business services application and electronic business-to-business marketplaces — have secured \$2.18 billion in venture funding through the second quarter. More than \$1.2 billion flowed to Internet-centric software and database companies during the same period, according to the firm.

Following the money, say venture capitalists and analysts, leads to the major trend within e-commerce: a focus on using Internet technology to completely revamp how companies share and use information to do business with one another. "The real focus of the next decade will be how to connect at a deep level with all the companies that matter to me," says Bruce Golden, a partner at venture capital firm Accel Partners in Palo Alto, Calif.

Golden and others say creating such "information liquidity" will require integration among internal core business systems as well as with those of key trading partners. Creating such data flow crosses every information technology discipline, as demonstrated by *Computerworld's* Emerging Companies list (see page 26).

While companies specializing in e-commerce, Web infrastructure and Web applications naturally are Internet-centric, so are virtually all of the companies on the list — even though they are in disparate categories such as application

development, customer care and supply-chain management, consulting and services, information and knowledge management, business process automation, systems management and security, and network and communications management.

For Ken Ross and Greg Olsen, co-founders of emerging company Extricity Software Inc. in Redwood Shores, Calif., capitalizing on the Internet's ability to re-engineer business commerce connections seems like a natural move. With Ross' background in enterprise resource planning (ERP) and Olsen's research in collaborative manufacturing and procurement, the duo saw a way they could help companies share and work with stored data on internal systems.

"There's a huge pool of productivity to tap in this glue between partners," says Olsen, Extricity's chief technical officer. But his research showed that while companies needed shared data, they wanted autonomy over their own systems and internal data use.

So Extricity uses Extensible Markup Language objects to define private, or internal, and public, or shared, processes for using a wide range of business transaction data. Adapter modules enable Extricity to quickly integrate with ERP systems and middleware that generate and collect that data, so the Extricity software acts as a broker.

For instance, Adaptec Inc. uses Extricity's product to instantaneously

share order entry, engineering specification and other data among Adaptec's systems and those of its manufacturers and their suppliers throughout Asia using the Internet, says Dolores Marciel, vice president of procurement at the firm. This "virtual fabrication" product saved Adaptec an estimated \$1.8 billion in time and construction costs for a new factory, has reduced cycle time from 105 to 55 days and is generating \$2 million in annual savings, Marciel says.

None of Adaptec's partners were required to implement SAP, which Adaptec uses, or any other common software — a point Ross believes is key to Internet business commerce. "The whole market is evolving so that many companies can conduct shared processes in a variety of ways," says Ross, now Extricity's CEO.

The firm is creating "templates" for common business processes specific to vertical markets.

Templates of future functions and migration paths were what many would-be e-business players tried to sell Marciel, who evaluated 60 companies before settling on Extricity. "We saw a lot of brilliant 'slideware,'" she says.

In other words, analysts and users agree that while there's a lot of exciting technology to choose from, it still pays for IT managers to invest wisely — and leave the billion-dollar risks to the venture capitalists. ■

Creating 'Sticky' Communities

In the brick-and-mortar commerce world, sometimes it's easier to accept bad service or to buy what's at hand instead of walking a block or two to a competing firm. Web retailers, though, are fast learning to live by a new adage: Competition is only a click away.

Preventing such instant defections requires Web businesses to create "sticky" communities of customers — customers who remain loyal to a site for reasons beyond its range of price, services or merchandise. And one of the best ways of adding adhesive to a Web site is to build stronger relationships with electronic cus-

tomers, say analysts and venture capitalists.

"If customers are impressed with your customer service foundation, they'll tell others, and you'll see your business increase," says Nate Connell, customer service supervisor for online technology bookseller Fatbrain.com. Many emerging companies on *Computerworld's* list, including FaceTime Communications Inc., Weblane Communications Corp. and Perceptual Robotics Inc., are offering products and services to help users lay such foundations.

While Connell and other users and analysts point out that building strong cus-

continued on page 4

► Emerging companies are working to help you attract customers to your site and keep them there

// By Sharon Watson

EMERGING COMPANIES 2000

continued from page 3

customer relationships requires a range of capabilities, including strong transactional and order fulfillment functions, they say the ability to offer Web customers fast, or even immediate, real-time help and service will soon be a key competitive differentiator. IT managers already have choices for how to accomplish that.

For instance, FaceTime is banking on instant messaging technology. "Instant messaging is a huge social phenomenon that builds brand loyalty," says David Hsieh, co-founder and director of marketing at the Foster City, Calif.-based firm. "We want to make it a useful technology for businesses."

To that end, FaceTime's Instant Messaging Service lets Web site visitors reach customer service with a click, then exchange instant messages and receive clickable Web site addresses and Web pages that specifically address their questions. Intelligent routing rules send incoming messages to appropriate service centers, and reporting tools show what areas of the site customers are visiting and which areas routinely generate questions, so that site design and content can be fine-tuned, says Hsieh.

Response in a Click

Igocorp.com, which sells electronic tools and accessories for the mobile businessperson, implemented a beta version of FaceTime instant messaging earlier this year, which has helped increase its average online order size by about 12%, says Ken Hawk, who has the unusual title of chief energizing officer at the retailer.

Mobile business customers — especially those calling from hotels — used to have to hang up their Internet connection and dial Igocorp's 800 number or else send e-mail. Hawk says both were unsatisfactory. "Real-time help was key," he says. "Now we can answer questions on the spot and even push relevant pages to our customers' browsers."

Hsieh claims FaceTime helps companies avoid the need for large call centers by helping steer Web customers back to self-service functions. Of course, many firms building Web presences already have large call center staffs, though integration between the two is often poor. At least, that's what Firdaus Bhathena, founder of Weblines Communications in Burlington, Mass., discovered when he tried to buy a product online a few years ago. He called the 800 number listed on the Web site, but the representative answering the call didn't know the company carried the product and wasn't able to look

at the Web site to see the item.

"It seemed to me that folks from the Web side of the business and those on the phone side only met when they were vying for space in the wire closet," Bhathena says. Weblines remedies this, he says, by integrating voice over IP, phone, chat and e-mail messages with existing back-end customer support systems.

For example, a Web customer may click on a "talk to me now" icon on Web sites such as those maintained by Cisco Systems Inc. and Trimark Investment Management Corp. A window pops up asking for the customer's preferred contact method, such as an immediate return phone call, e-mail, chat or voice over IP. If the customer selects the phone, a customer service representative calls within seconds. Routing rules can direct calls to representatives with different help expertise depending on where within a Web site a customer clicked for help. For instance, Cisco uses routing rules that help ensure the representative speaks the customer's native language, says Bhathena.

Then, by sending a small applet to the caller's browser, the service representative can guide the customer through the Web site, all while carrying on a conversation. Throughout, the customer retains full use of his browser, and when the session is done, Weblines's applet disappears.

"We needed to integrate our site with our call center applications," says Stephen Main, assistant vice president of information systems at Trimark Investment Management Inc. in Toronto. The firm uses Weblines to educate brokers about its products and help them fill out online applications. "A lot of vendors made integration promises, but only Weblines could make it work," Main says.

Such service will build the loyalty of shoppers by giving them a more personal relationship with a company, say analysts. And what better way to build such bonds, says Paul Cooper, co-founder of Perceptual Robotics Inc. (PRI) in Evanston, Ill., than to give customers control over what they can see via a Web site.

PRI's Telepresence cameras and software

enable Web customers to focus a camera at a physical site, at whatever object, event or person they like. The camera takes a JPEG still, which is transmitted back to the browser, freeing the camera for another user. "The viewer is in control of the experience, so it's personal, meaningful and holds their attention," Cooper says. "Holding their attention equates to dollars and cents."

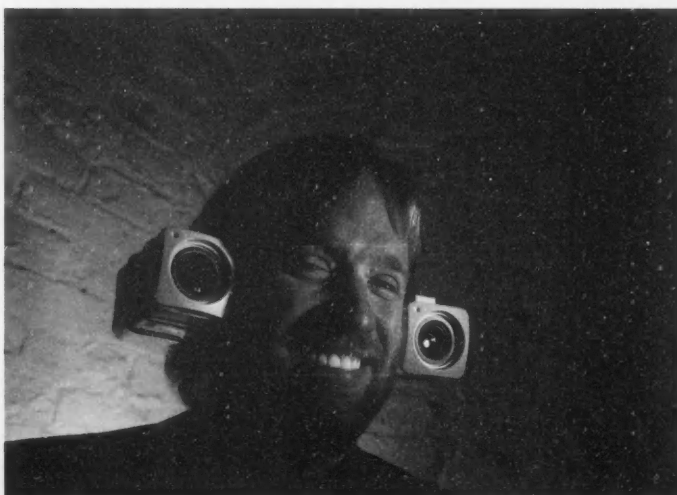
Look Before Buying

At Gallery Furniture in Houston, that equation is a big one. The store, with annual revenue of \$120 million, expects the PRI Look and Buy system it installed to help grow that revenue to \$1 billion per year by turning it into a national Web retailer, says Walt Dunnigan, IT manager at Gallery.

"We want to be doing things differently than other Web sites," he says. Visitors to Gallery's site may control any one of 37 cameras installed in the showroom, zooming in on whatever catches their interest, from couches to antique tables. By focusing on a price tag, they can see an item number they can enter into a field next to the photo. In moments, the customer is viewing a description of the furniture and with a click, may add it to his shipment. "It's being there at a distance and re-creates the emotion surrounding shopping," Cooper says.

And as long as customers have good feelings about Internet commerce, say analysts, it's sure to grow ever stickier. ■
Watson is a freelance writer in Chicago. Contact her at sjwatson@interaccess.com.

▼
Paul Cooper of
Perceptual
Robotics:
"Holding
[customers']
attention equates
to dollars and
cents."



Marc Burrows

WHAT IF...

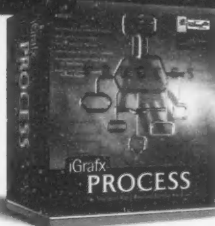


- ...We ramped up production?
- ...Orders started pouring in?
- ...We re-organized?
- ...We reduced costs?

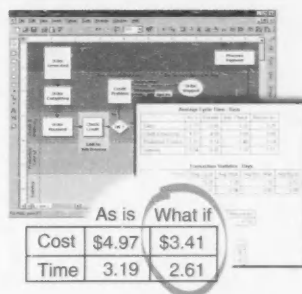
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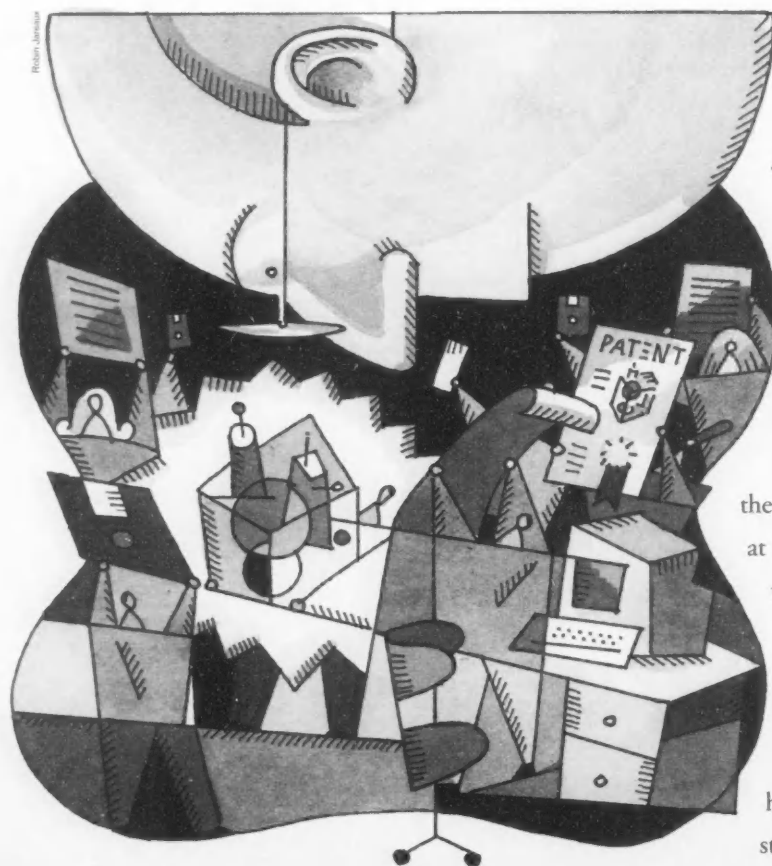
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How to Evaluate an Emerging Company

► Buying from young IT companies can be risky, but the rewards can be high as well. Besides, there are ways to mitigate the risks // By Gary H. Anthes



Du Pont Co. loved the technology in a new workflow product, but it had serious reservations about the software's developer, a Silicon Valley start-up.

"They had delusions they could take the company public in a lot less time than I knew it would take. And they were undercapitalized," says David Pensak, a senior research fellow at the Wilmington, Del.-based chemical giant.

But Pensak figured out how to collar the technogoodies and limit Du Pont's risk at the same time. He struck a deal in which the fledgling vendor assigned a key technician to the Du Pont account, and in exchange Du Pont promised to hire him if the vendor went out of business. "The guy suddenly had security because he didn't have the risk of working for a start-up," Pensak says.

Sure enough, the start-up shut down, and the technician worked for Du Pont long enough to get the workflow system debugged, stable and documented. "Without him, we'd have had no choice but to jettison the product and go through a wrenching transition," Pensak says.

Du Pont's experience has two lessons for information technology managers wondering if they should buy from emerging companies: The practice has risks, but there are ways to manage them. Indeed, a greater risk may lie in *not* buying from emerging companies. Technology is so pervasive and volatile today that it may no longer be good practice to rely on a handful of old-line IT vendors, even if they have some new-line products.

"The life of our technology is so short that it often doesn't pay to sacrifice features, technology lead or price for the stability of larger, slower-moving companies," says Brent Lowensohn, manager of research and development for IT at Kaiser Foundation Health Plan Inc. in Pasadena, Calif.

Besides, Lowensohn adds, the risk of buying from emerging companies is greatly exaggerated. "I've probably had three or four failures in 20 years," he says.

Buying Guidelines

Buyers at J. P. Morgan & Co. in New York examine not just the products, but also the "architectural philosophies" of emerging IT vendors, says Michael Feldman, a vice president and software engineer. "We want to know how they see the market going and whether their ideas coincide with our ideas," he says.

J. P. Morgan sometimes makes an up-front payment to help finance the development of a product it needs in exchange for the vendor's promise to pay the company royalties once the product goes commercial. Just in case, the contract calls for a software "escrow" arrangement by which source code can be obtained from a neutral third party if the vendor can't continue to support it.

Sometimes the deal includes J. P. Morgan assigning technical and subject-matter experts to help in product design. Says Feldman, "We end up being the first major player on the street with the software, plus we have the software more in tune with the way we do business because we influenced its development. But it's a balancing act," he adds. "You would never want to share information that might diminish your competitive advantage."

Pensak is especially wary of Internet and data mining start-ups because of the hype.

"They're making claims their technology will walk on water, heal the sick, raise the dead and save you millions of dollars," he says.

Pensak won't buy software from one of those companies without a free, no-obligation "home trial" first. One company showed him a successful demonstration of a product but couldn't get it to run at Du Pont after six days of on-site effort. He says it's relatively easy to come up with one good product, but much harder to craft business and technical plans that can carry a company through rapid marketplace change, so buyers should seek assurance that a vendor won't turn out to be a one-trick pony.

But Pensak concedes that's not always easy to determine. Sometimes it comes down to gut feel, he says.

Product Scrutiny

Lowensohn says he visits the offices of emerging vendors to look at manufacturing lines and to talk to executives. "We get a feeling for whether they know where they are going and whether they have a plan to get there." Asked if he ever finds great technology and poor management at the same company, Lowensohn laughs. "Yes, and it's so upsetting. You really want to use that technology because it can help your company, yet you know you can't get within 50 yards of it because it will fall apart and hurt you."

But all may not be lost, he says. "In those cases, we have intensely poked on those companies and their backers to try and clean things up." Lowensohn says Kaiser became involved with three vendor groups that were headed down separate standards paths in an area he declines to name. "We said, 'Look, you're building yourself into a box that will hurt everybody.' We helped mediate a coalescence of standards, and now we can deploy those products, because there will be interoperability."

McDonald's Corp. takes various steps to qualify emerging IT companies, including vendor site visits and financial checks with The Dun & Bradstreet Corp. But the most important one is user references, says David Weidenfeld, chief counsel for technology.

Weidenfeld advises visiting customer sites to see how a technology is used and even recommends encouraging other prospective customers to visit McDonald's if the chain already has the product. "The more money the small start-up makes, the more stable it's going to be," he says. "The broader the customer base, the more protected your investment is."

There are other ways to protect your

investment, Weidenfeld says. He likes negotiating with business-hungry start-ups because they often agree to terms such as long-term price caps that more-established companies resist. He asks for a guarantee that if the vendor introduces a new product that supersedes the one McDonald's bought earlier, the vendor will sell it to McDonald's at the same percentage discount and credit the amounts paid for the original product.

Weidenfeld discounts source code escrow arrangements, saying that in most cases it is not practical for McDonald's to take over complex, unfamiliar software. Rather, he asks emerging companies for the names of its top developers in the contract and the right to hire them if the vendor becomes unable to support the software.

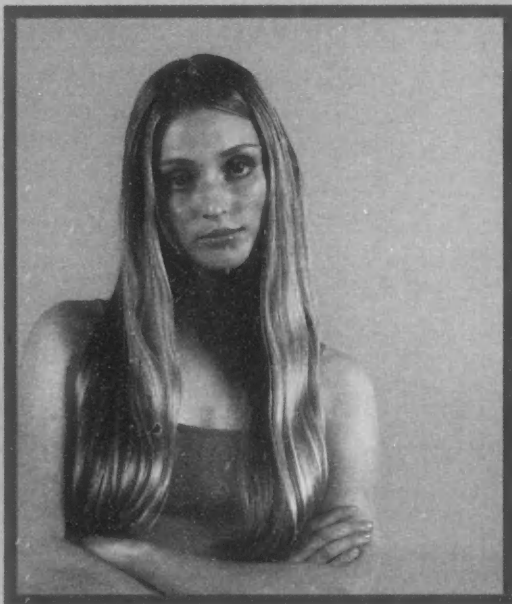
But Weidenfeld says buyers can worry too much about start-ups. "A lot of people are scared of these companies, but that doesn't make a lot of sense, because these are the folks that are real innovators." *Anthes is Computerworld's features writer, business and technology.*



The risk of buying from emerging companies is greatly exaggerated.

Smart Shopping at IT Start-Ups

1. For important applications, visit the vendor and talk to key management and technical personnel.
 - Does the vendor have a business plan and a technical framework likely to ensure longevity of the company?
 - Does it have a robust customer-support operation?
 - Does it have adequate financial resources?
 - Will it supply customer references?
2. Negotiate the right to hire key technical staff if the vendor becomes unable to support the product.
3. Check references. Visit references' sites, if possible.
4. Consider helping the start-up by taking an equity stake in it. Consider underwriting part of product development in exchange for royalties or favorable contract terms.
5. Insist on a free, no-obligation trial of the product in your company.
6. Seek the advice of financial and technology analysts, market research firms, consultants and IT colleagues inside and outside your company.
7. If you are likely to become one of the vendor's premier customers, don't hesitate to "jawbone" management and/or financial backers into fixing product or company weaknesses.
8. Ask that source code be held in escrow by a neutral third party.
9. Finally, don't forfeit access to the best technology over exaggerated fears about the risks of dealing with start-ups.



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Network and Communications Management:

Managing the Network With Emerging Companies

► These firms tackle the network puzzle from various angles // By Amy Helen Johnson

Network management

was always an arcane art. Now that computers are ubiquitous and Internet access is a corporate imperative, the job is even more complicated.

It's no longer enough just to wire your users to the company's servers. Now you must maintain an acceptable level of availability, guarantee a good response time, run at optimal capacity, integrate e-commerce sales support into the network, route voice traffic over your data lines, enable salespeople in Timbuktu to access the network and give your boss a weekly summary of network performance.

In addition to noticing that your job has grown more complex, you've probably realized that the tools you need have become more specialized. Each of the 10 companies on our Emerging Companies list in the network and communications management category has tackled a particular piece of the networking puzzle.

Although no two offer the same products, there are similarities. These companies target customers with IP networks, and they're pushing the benefits of better performance in the face of rocketing data traffic.

One of the newest companies in this category, 2-year-old Altiga Networks in Franklin, Mass., is trying to fix two problems at once by giving corporate users remote access that performs well when transmitting a large amount of data. Altiga's solution is to use virtual private network (VPN) access servers, focused on the broad-

band subset of VPN applications — carrying high-bandwidth data such as graphics and video. Altiga's VPN Concentrator products also allow remote access using fast connections, such as Digital Subscriber Line and cable modems, that help boost performance. Altiga recently announced a Windows 2000 VPN client.

The client applications use the open-standard Point-to-Point Tunneling Protocol for connectivity and support network security procedures such as log-in authentication. At the University of Rochester in Rochester, N.Y., the VPN Concentrator has given students, professors and administrative staff freedom of movement. Users no longer have to be on campus to access resources such as the library databases, says Tom Armadning, a network engineer at the university. "We can authenticate people through Altiga even if they're not local," he says.

Thinking Globally

Although Altiga's product family scales from 50 to 5,000 connections, three other companies, Cerent Corp., GRIC Communications Inc. and eFusion Inc., aim their products at global network installations. Cerent, in Petaluma, Calif., targets optical networks and cable TV networks. Its product, Cerent 454, is a single-card solution that bundles Synchronous Optical Network/Synchronous Digital Hierarchy transport with switching and routing capabilities so it can handle voice traffic simultaneously with IP, Asynchronous Transfer Mode (ATM) and frame-relay data. It allows networks to increase capacity without running more cable.

"The Cerent product provides us with a greater operating efficiency to expand and

modify our existing networks with minimal impact," says Clifford Rudolph, chairman and CEO of Advanced TelCom Group, a telecommunications company in Santa Rosa, Calif. Advanced TelCom considered competing products from Lucent Technologies Inc. and Fujitsu America Inc., Rudolph says, but chose Cerent's because of its more favorable price and size. Cisco Systems Inc., an early investor in 3-year-old Cerent, bought the company this August; the deal is scheduled to close by the end of January. The networking equipment giant hasn't announced its post-acquisition plans for Cerent.

Targeting the network's services, GRIC Communications in Milpitas, Calif., offers a Java-based software product called GRIC CSP, which lets service providers offer fax-

"There were products providing raw data but not telling you if you have a problem." — Shaula Yemini, System Management Arts



EMERGING COMPANIES 2000

ing, Internet roaming, VPN remote access and IP telephony applications to their customers. Its pitch, similar to Cerent's, is that you don't have to touch your network infrastructure; GRIC CSP works with leading equipment vendors like Cisco and Lucent.

GRIC's Internet provider customer list spans the globe. In the U.S., national Internet provider companies like America Online Inc. and Mindspring Enterprises Inc. and regional providers like Hawaii Technology Services use GRIC products to offer roaming services to their users.

GRIC has missed one niche, which another hot company, Beaverton, Ore.-based eFusion, has snuggled into. The company's eStream gives service providers a new product to offer subscribers: a way to send and receive phone calls while using the phone line to log on to the Internet. Lily Sun, group manager for IP services at US West INTERPRISE Networking in Denver, says eStream has been a money maker. The company offers a subscriber application, Online Call Alert, powered by eStream, that's earned new customers for USWest.net, the company's Internet service provider arm.

eFusion has also used the eStream technology to build a corporate application, eBridge, that marries a retailer's call center and online catalog so customers can simultaneously shop the Web and talk to a sales rep.

"While the Amazon.com model was working great," says eFusion President and CEO Ajit Pendse, "online brokers were figuring out that there were a lot of transactions not being fulfilled because there wasn't someone to answer questions."

F5 Networks Inc. in Seattle addresses another problem that affects not just shoppers, but anyone who visits a corporate site — slow servers. For Internet sites with duplicate, distributed server farms, its 3DNS traffic distributor sends visitors to the server farm that will give them the best connection based on site availability and response time. At the local level, the BIG/Ip load balancer parcels out user requests among the machines in the server farm.

For Dwight J. Gibbs, the self-described chief techie geek at the Motley Fool, an Alexandria, Va.-based investment Web site, using BIG/Ip has meant peace of mind. "I don't have to worry about availability, at least with regard to our load balancer," he says. "Thanks to our friends at F5 Networks, our site is always up."

Performance is also the priority at Concord Communications Inc., Quallaby Corp., Segue Software Inc. and System Management Arts Inc. Each has an approach to monitoring, analyzing, tuning, testing,

diagnosing and fixing network performance.

Marlboro, Mass.-based Concord's Network Health family of products reports on a range of enterprise network elements including LANs, WANs, routers, hubs, frame relay, ATM, servers and applications.

Joe Askins, director of data communications at Arizona State University in Phoenix, says Network Health has "saved us millions." Using Network Health to monitor the Ethernet connections on four campuses has allowed him to maintain the network at capacity and upgrade when needed.

Riding a Trend

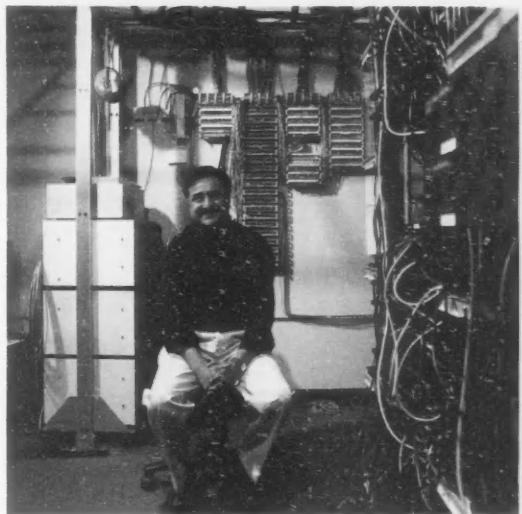
Quallaby is on top of an important network management trend, according to John Morency, executive vice president of consulting at analyst firm Sage Research in Natick, Mass. There's a growing need among enterprises with mission-critical Web and e-commerce sites to get concrete data on Internet services rendered by Internet providers. "Implementing one or more e-commerce services creates the need to manage access to those services in a more deterministic, production-oriented manner," Morency says. "Ensuring that [Internet service providers] consistently live up to their service-level commitments is one key part of meeting that need."

The Burlington, Mass., company's Proviso products collect network performance metrics; a reporting module analyzes the data, using canned or customized reports.

Segue Software takes a testing approach to ensure that network applications have enough bandwidth and response time. The Lexington, Mass., company's SilkPerformer module load-tests Web, application and database servers by simulating transactions with a broad range of modem speeds, browser versions and access protocols. Segue's SilkPilot and SilkObserver modules dig down to the object level, testing the performance and reliability of distributed objects and middleware.

"If we didn't have Segue and had to manually test all of our applications and rating products, we'd have to increase our quality assurance department tenfold," says Donna Robertson Pfaff, assistant vice president of quality assurance at Beverly, Mass.-based Insurance Holdings of America Inc., which develops software for the insurance industry.

The focus at System Management Arts is on finding and fixing problems, not just collecting data. "There were more and more products providing raw data but not telling you if you have a problem and what is its



source," says Shaula Yemini, founder and CEO of the White Plains, N.Y., company.

System Management Arts' InCharge System operates on the same theory as fingerprints: Every root-cause network problem creates a unique signature of symptoms and effects. If InCharge diagnoses the root cause quickly, then it gets fixed quickly, maximizing network uptime.

Using InCharge IP Fault Manager has cut the number of problem tickets by 70% at Bell Nexxia, a Canadian Internet provider in Montreal. "We can filter out glitches that last a few seconds and concentrate on problems that are more solid," says Bert Mariani, network tools manager.

Low cost and ease of use are the differentiators for Cobalt Networks Inc.'s Web servers. Cobalt, in Mountain View, Calif., doesn't sell just hardware. Its Qube and RaQ products are turnkey systems that include a Linux operating system, Apache Web server software and e-mail and page-creation tools. SimpleNet, a division of Santa Clara, Calif.-based Yahoo Inc., uses Cobalt's RaQ hosting solution as the platform for its virtual-hosting customers.

"The relationship with Cobalt has let us provide a user interface that maintains our goal of keeping Web hosting simple and useful," says Allen Cocumelli, chief operating officer at SimpleNet. The benefit is that by virtually hosting their site on SimpleNet's RaQ servers, instead of maintaining their own hardware, customers can easily scale up their sites as their business grows. Johnson is a freelance writer in Seattle. Contact her at amyhelen@pobox.com.

▼
"There were a lot of transactions not being fulfilled because there wasn't someone to answer questions." — Ajit Pendse, eFusion

It's Not the Money

► Strategy rules in tech start-up investments // By Kathleen Melymuka

Last November, Bill Donner was touring Israel when a group of men chased him onto a bus. Holdup? Murder? Hostage taking? Not quite. His pursuers were pitching a business plan in hopes of snagging an investment from Reuters Group PLC, where Donner is chief technology officer for the Greenhouse Fund, an in-house investment program. "They really chased us down," he laughs. But the tactic worked. "We're looking seriously at investing in that company," he says.

Corporate investing is nothing new, but the emergence of electronic business has brought a new urgency to the wheeling and dealing. "Everyone's watching the new economy to learn — not only technology, but also new organizational and business models, practices and processes," says Vish V. Krishnan, associate professor of management at the University of Texas Business School at Austin. "All kinds of synergies can be created."

Donner says investing enables Reuters to influence the direction of some strategically useful companies with the added benefit of financial gain if the businesses take off. "If we didn't invest, we would be watching; here we're participating. And our participation is affecting the way technologies develop."

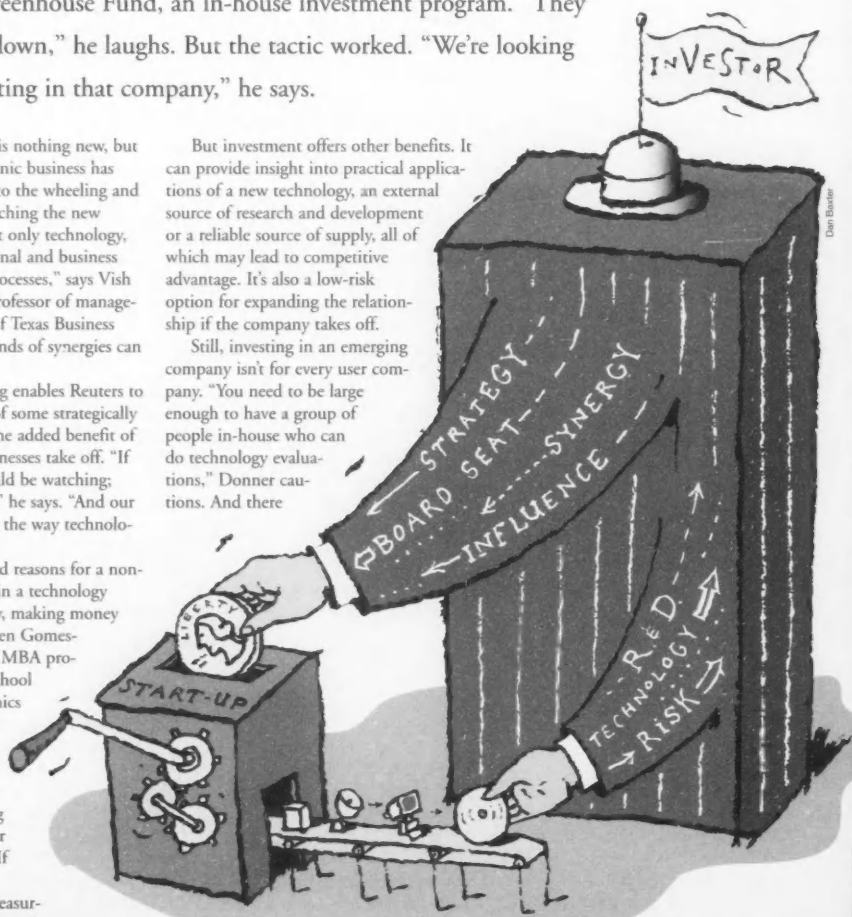
There are lots of good reasons for a non-tech company to invest in a technology start-up, but surprisingly, making money isn't one of them, says Ben Gomes-Casseres, director of the MBA program at the Graduate School of International Economics and Finance at Brandeis University in Waltham, Mass.

"That's the worst reason to do it," he says, adding that there are much surer ways to make a profit. "If you want a financial investment, have your treasurer decide on a stock strategy."

But investment offers other benefits. It can provide insight into practical applications of a new technology, an external source of research and development or a reliable source of supply, all of which may lead to competitive advantage. It's also a low-risk option for expanding the relationship if the company takes off.

Still, investing in an emerging company isn't for every user company. "You need to be large enough to have a group of people in-house who can do technology evaluations," Donner cautions. And there

▼
"If we didn't invest, we would be watching; here we're participating. And our participation is affecting the way technologies develop."
— Bill Donner, Reuters Group



are plenty of other caveats. Investing is a risky business, and financial losses could be the least of your worries (see story at right). But when things click, everybody's a winner.

E-Commerce Connection

GE Appliances in Louisville, Ky., hopes to click with an investment in BuildNet Inc. in Durham, N.C., that positions the company to influence and profit from the evolution of e-commerce in the home construction business. Before the investment, BuildNet sold back-office software to builders, but it planned to transform itself into a facilitator of e-commerce throughout the construction supply chain through strategic mergers with several other vendors.

The idea resonated with GE, the largest supplier of appliances to the home construction market. "The Internet moves so fast you can't build everything yourself," says Paul Ryder, general manager for e-commerce. "So we're constantly looking to see if anything being developed out there has a good synergy with GE."

GE Appliance teamed with GE Capital, which was independently considering the deal, to provide a combined \$10 million investment that facilitated BuildNet's mergers last May. The investment landed each GE company a board seat, along with the ability to influence the business plan, technology, interfaces, hiring and marketing, Ryder says. GE will be one of up to 10 manufacturers that invest in BuildNet.

"They've accepted the fact that everybody needs to be able to play," says BuildNet President Mike Arwood. But GE believes e-commerce is the future of the home building industry, and it intends to play on the first string.

A Living Lab

Aliant Inc. is a telecom company that was recently formed through the merger of four phone companies along Canada's eastern seaboard. (Its headquarters is literally "virtual.") Aliant's growth strategy is to build unique products and services for its own customers, then export them outside Canada to expand its market. Toward that end, it has invested in more than a dozen companies during the past four years, including a 51% share in iMagicTV Inc. in St. John, New Brunswick.

Aliant is working with iMagicTV to deliver integrated television and Internet over phone lines. Then iMagicTV will mar-

ket those services first to Aliant customers, a trade-off requiring that early development be geared to Canadian specs that aren't always applicable to the broader market.

The Aliant connection is opening doors to other markets, says Gerry Verner, vice president for marketing and finance at iMagicTV. He says the relationship as an "innovation machine" built on complementary strengths. "They have a lot of learning. We're doing joint research on the user interface and trying it out on customers in the field," he explains. "It's a living lab environment."

Technology's Pulse

"We look at [investment] as a stethoscope on new technologies," says John Cayce, managing director of the Strategic Enterprise Fund at United Parcel Service of America Inc. in Sandy Springs, Ga.

Among eight current UPS deals is a million-dollar equity investment in NETdelivery Corp. in Boulder, Colo., which provides electronic-billing technology. UPS is hoping the technology might expand an electronic document delivery product it introduced last year. For its investment, UPS gets preferred stock in the company, an observer at board meetings and an informal working relationship. "Part of what we do is try to facilitate interaction between them and appropriate groups within our organization" that might use the technology, Cayce says.

Timing and Strategy

As for when to invest, there's no fast rule. Conservative corporations frequently invest in later rounds, Krishnan says, preferring to pay more for a smaller stake with less risk. Companies familiar with the technology, connected in the investment arena or just less risk-averse tend to get in earlier.

Reuters' Greenhouse Fund has invested in

Risky Business

Despite the potential benefits of investing, there are some huge risks. The start-up could be misrepresenting itself. It could face unanticipated competition, fail to execute because of inadequate management or lack the intellectual property rights to the product it's trying to bring to market. The investor could pay too much or get locked in to the wrong technology.

Thorough due diligence prior to investing can uncover these dangers, but the biggest risk — and more difficult to mitigate — is blowing the relationship through mismanagement. "A corporate venture capitalist is a servant of two masters," says Josh Lerner, professor of business administration at Harvard Business School in Cambridge, Mass. "You've got to benefit your corporation, but you've also got to be credible in the venture community." For example, you can't demand exclusive deals that would be unfair to other investors. "It's a fine line between making investments that might benefit the corporate parent and not

insisting on things that will deter more traditional investors," he says.

Bill Donner, chief technology officer for the Greenhouse Fund at Reuters Group, notes that relationships often suffer from unrealistic expectations. Start-ups may be unreasonably optimistic about what the relationship will mean to their company, he says. They fail to understand that "it takes a long time to move a product through to where we are putting our brand on it."

The record for corporate investors hasn't been great, Lerner says. In a study of 30,000 traditional and corporate investments, he found that corporate groups with a strong strategic focus that could add value to their portfolio companies achieved about the same degree of success as independent investors. Corporate investors without those characteristics did much more poorly. "People have been constrained by corporate issues, and a lot of programs have been dissolved," Lerner says. "You really need to get a lot of things right." — Kathleen Melymuka

"We look at
[investment]
as a stethoscope
on new
technologies."

— John Cayce,

UPS



23 tech start-ups since 1994 and approached investments both ways. "We've done some investments where we thought they had a great idea and not much more than a couple lines of code," Donner says. And "we've become involved with some companies that are close to [an initial public offering]."

Venetia Kontogouris, president of Enterprise Associates, a London venture-capital spin-off of Dun & Bradstreet, tends to come in early, especially in the Net environment. "With Internet, I'm very early, as early as 'Here's the business plan, and I need to find people to put around it,'" she says.

While investing in technology start-ups is an attractive option, it should be one part of a larger strategy, cautions Gomes-Casseres, author of *The Alliance Revolution: The New Shape of Business Rivalry* (Harvard University Press, 1996). "It's the strategy behind the deal that counts," he says.

"Where are you trying to go? What else are you doing to get there?"

"When you look at an investment, look at that," he says. "If it all fits, it has a good chance of success. If it stands out there, it has a good chance to fail." ▶

Melymuka is Computerworld's senior editor, managing.



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Web
Applications:

The Other Internet Applications

► Web applications simplify internal processes and empower users // By Julekha Dash

E-commerce firms may be the darlings of Wall Street, but many companies are leveraging the Internet for reasons other than selling products online.

Computerworld has selected seven hot emerging companies that offer Internet-enabled applications some top Fortune 500 firms are using internally. These firms have capitalized on the Web browser's ease of use to deliver solutions intended not for the information technology department, but instead for corporate divisions such as marketing, business development or training. Many of these companies have grown significantly in the past year, either in revenue or size.

Why are companies purchasing this software? They're using the tools for a variety of applications, including data analysis, corporate communications and mobile solutions.

Computerworld contacted customers of four of the selected emerging companies

that deliver internal Web applications. The case studies are featured below.

Customer Case Study:

National Football League Properties Inc.
Product: Usadata.com's MarketTarget

Since purchasing Usadata.com's MarketTarget business intelligence solution three years ago, the National Football League has won new sponsorships in industries such as airlines, financial services and auto rental. These were industries the NFL had wanted to attract in the past but didn't have the data to prove to these prospective clients that their dollars would be well spent, according to John McCauley, senior director of planning and communications at NFL Properties Inc.

Usadata's online application provides the NFL access to a database of aggregated results from 175,000 consumers surveyed each year, including data on how many people attended an NFL game or watched one on TV last year.

The NFL also is using a proprietary system developed by Usadata.com, LifeStyle Connect, an add-on product that segments consumers into various lifestyle categories, such as sports fans. A customized interface between Usadata and demographic information on the 31 markets that the NFL teams serve helps the league and local

clubs win new business as well.

McCauley says he hopes his team will soon get more detailed information on fans. For instance, the company can currently view female NFL fans between the ages of 25 and 44, but not those who are married with a professional job with an income between \$25,000 and \$50,000. The NFL is working with Usadata to enhance the tool's drill-down capabilities.

Prior to signing with Usadata — whose competitors include The Dun & Bradstreet Corp., Lexis-Nexis and Experian — the NFL would pay outside research companies anywhere from \$5,000 to \$7,000 for a customized report, with a turnaround time of two days to a week. Now the NFL can get the information in a matter of minutes.

"We can respond more quickly now. For every deal or renewal we secure, the tool pays for itself," McCauley says.

Moreover, an online application offers a distributed solution, so decision-makers can quickly gather the data they need to secure new sponsorships or renew existing contracts, without relying on a central administrator. Executives now can walk into a meeting with data that shows NFL fans use, or may use, the prospective client's product.

"It's a compelling story for people looking to invest their marketing dollars. There are a lot of media options for people to spend their money on," McCauley says.

And the NFL isn't the only company betting on Usadata's solution: Usadata expects to have added about 500 new customers by the end of the year, according to CEO Ric Murphy. The company projects that revenue growth from this year to next year will be over 200%.

►
"We can respond
more quickly
now. For every
deal or renewal
we secure, the
tool pays for
itself." — John
McCauley, NFL
Properties



Case Study:**Tandem Division of Compaq Computer Corp.
Product: Eloquent Inc.'s Eloquent Presenter**

Whether it's a videotape or CD-ROM, corporate training solutions that feature no more than a talking head aren't very popular among employees. But Tom Hill, program manager in the education and training center at Compaq's Tandem division, says that isn't the case among users of Eloquent Presenter.

The tool merges audio, video, PowerPoint slides and searchable scrolling text in an indexed database, making it a more dynamic learning experience than most other training tools, Hill says. Tandem began using the solution four years ago, primarily to train employees on new products. Eloquent CEO Abe Kleinfeld says many customers are moving face-to-face meetings to the Web because executives are limited in time. "We're replacing an airplane and an auditorium with the Internet."

Because of Eloquent's use of streaming media, the presentation runs quickly even with a 28.8K modem, Hill says. This is particularly useful for field sales and support people, who typically aren't equipped with faster modems. Accessing presentations on the Web is also less cumbersome than carrying dozens of CD-ROMs.

Prior to using Eloquent, which competes with Vstream Inc. and Macromedia Inc., Tandem relied on the "bricks and mortar" approach to product training, flying sales and field support four times per year on average. Though Tandem's cost savings vary by product line, Hill says the cost reduction ranges from 50% to 80%.

Hill says the solution is appropriate for those concerned with high-level quality presentations. But for those who just want to deliver simple text and audio, there are cheaper and faster ways, he says. Why is Tandem interested in quality presentations? "If the content is not detailed and easy to understand, the quality of service for customers is going to drop," Hill says.

Case Study:**Onyx Software Corp.
Product: Netpodium Inc.'s Event Hosting Services**

Angie Reiker-Weiser, director of market development at Onyx Software Corp., a customer relationship management provider, says since the company began using Netpodium's Event Hosting Services last

spring, it has cut meeting costs for its direct marketing seminars by almost half. The company no longer has to pay for meeting facilities, refreshments and other costs associated with a live presentation geared toward prospective clients. In addition, Onyx can hold one event for all of North America rather than holding local seminars in various cities.

Though Onyx uses the solution externally, the company plans to use Netpodium internally as well, to train its sales force. Most Netpodium clients use the solution as a corporate communications tool internally, such as for training, and externally, such as for press conferences, says John O'Halloran, vice president and general manager at Intervu, which recently purchased Netpodium.

Kelly Jurgensen, direct marketing specialist at Onyx, says that because tuning in to a Web event requires less time, attendees are "less likely to blow off a seminar." And the numbers indicate that as well: Between 120 and 150 people attend each broadcast, while at the live events, head counts ran in the low 20s. Early next year, the company also hopes to slash costs associated with training its sales force on new products. Jurgensen estimates flying these employees costs the company between \$1,500 to \$2,000 per day per person — not including lost time in generating sales.

Netpodium's software also features an online polling function that enables Onyx to push questions to the audience.

"It's a very inexpensive way to get a captive audience to broadcast a message," Jurgensen says. Onyx has been using Netpodium's Event Hosting Services but will implement Netpodium 2.0 by January.

But the solution isn't ideal for one-on-one collaboration or even small groups. For an audience of less than 20, Netpodium "is probably more powerful than what you need," Reiker-Weiser says. And Jurgensen adds that because Netpodium — which competes with PlaceWare Inc., Contego and Centra Software — isn't plug-and-play software, companies short on IT resources might consider using the vendor's hosting service instead of purchasing the software.

Case Study:**Catholic Healthcare West
Product: AvantGo Inc.'s AvantGo Server**

Jim Sanderson, senior systems engineer at Catholic Healthcare West in San Francisco, says he decided to purchase

AvantGo Server last January to provide caregivers access to clinical applications via handheld devices, which are useful for employees who rarely sit in front of their PC.

For instance, using a PalmPilot, a radiologist can retrieve stroke data from the intranet, while also downloading CAT scan and magnetic resonance images from the stroke database. Or a cardiologist can access a clinical application that helps assess whether a patient is at risk for developing a heart attack.

Currently, Catholic Healthcare West is developing a Web-based PalmPilot application for tracking the progress of intravenous patients. "This will replace the 3-by-5 paper cards that nurses carry in their pockets," says Sanderson. AvantGo CEO Felix Lin says Catholic Healthcare West's experience is similar to many of AvantGo's other customers.

"Many companies collect data using pencil and paper. We saw the opportunity to take handheld devices and extend business automation to the point of activity," Lin says. He adds that AvantGo's revenue and customers are at least doubling every quarter.

The pharmacy unit of Catholic Healthcare West is also considering converting its stand-alone handheld application for tracking medications to a Web-based solution using AvantGo.

"Our primary focus is to improve the quality of care while lowering delivery costs. The most cost-effective method of collecting and retrieving medical data is the Internet," Sanderson says.

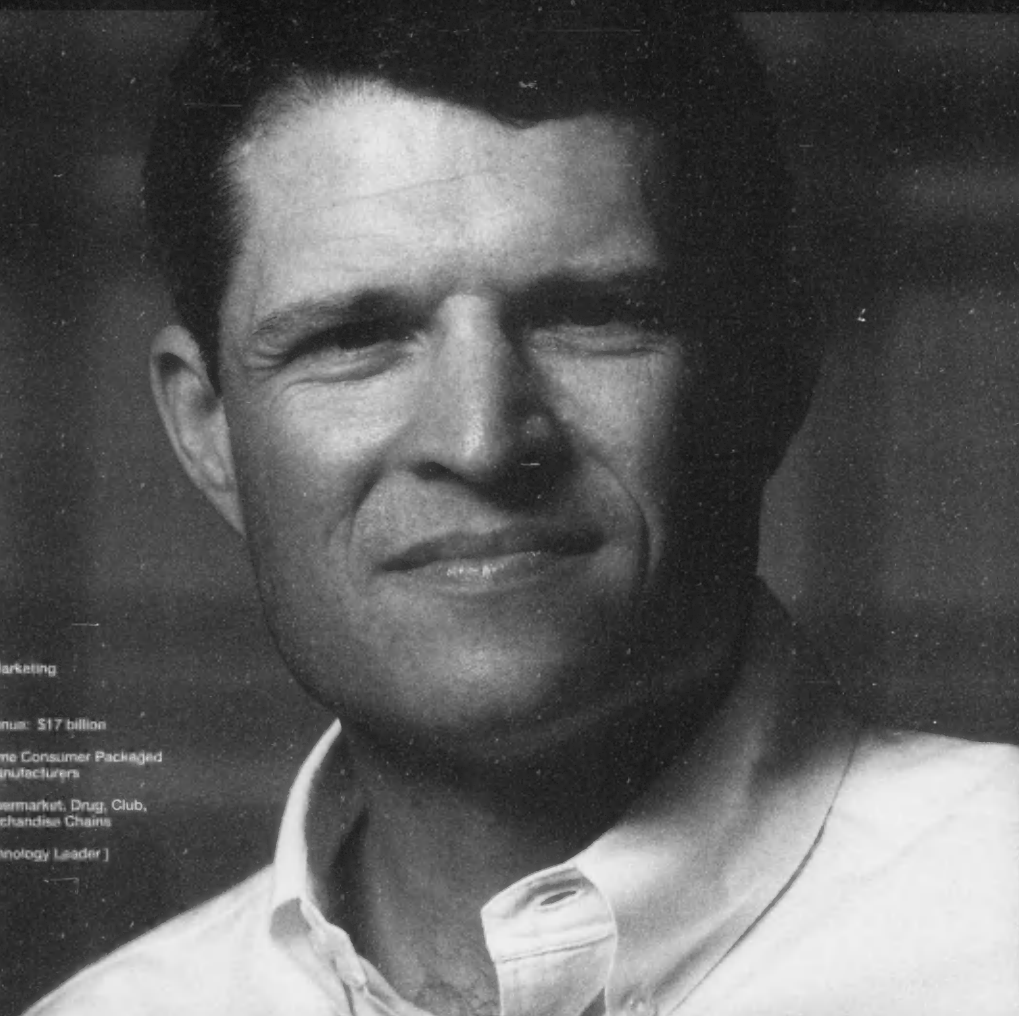
According to Sanderson, the use of frames would enhance AvantGo's user interface by adding options and making it more navigable, though he realizes the small screen size of handhelds makes adding frames difficult. "We would like to see the ability to turn frames on or off at the developer's discretion at the application level."

Dash is a Computerworld staff writer.



South Atlantic

▲
"Many companies collect data using pencil and paper. We saw the opportunity to take handheld devices and extend business automation." — Felix Lin, CEO, AvantGo



Kevin Paugh, CIO
Advantage Sales and Marketing

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Clients: Brand-name Consumer Packaged
Goods Manufacturers

Customers: Major Supermarket, Drug, Club,
Mass Merchandise Chains

[Market Leader, Technology Leader]

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Living With Start-Ups



► For big companies, working with emerging companies can be like adopting an unruly child

// By Allan E. Alter

"It was the damnedest thing I have ever run across," says Dick Hudson, CIO at Global Marine Inc. in Houston. Hudson had paid good money up front to a young financial applications outfit, which agreed to add new functions to its software in eight months.

But when the deadline came, not only was the work not done, some of the software's existing functions had been removed because they couldn't be made to work properly.

"We asked for a full refund," Hudson says. "The president and the top sales manager flew to meet us, and the salesman gave

us the damnedest statement: 'Between the time I signed the contract and the day of our meeting, the truth has changed.' The truth being that because the product wouldn't work, they didn't have to give Hudson the additional functions he had asked for. To top it off, they said they had the right to hold on to Hudson's money. "If you adopt that, it means there's no contract law in America," says a still-miffed Hudson.

That's the danger of start-ups. Many of them wow you and promise to take you to the leading edge. But once you buy the product, it doesn't work or development drags along interminably.

These are "very small companies with very big ambitions," says Eric Esperne, purchasing manager at MCI WorldCom Inc. in Arlington, Va. He says he has seen companies ask for advance payment, freely acknowledging that they needed working capital to stay afloat. "I have to tell them that we are a telecommunications company, not an investment banking firm."

There's no substitute for setting up the relationship at the negotiation stage, according to information technology executives who buy from emerging companies (see story, page 8). If you do your homework, ensure you've made your requirements understood and refuse to open your wallet too soon, you're more likely to limit your troubles, they say. After the sale, your power dwindles considerably.

So what can you do to keep a young vendor in line after you've signed the deal?

First, watch like a hawk. Look out for missed milestones: due dates, time lines and failures to produce documentation. If deadlines are missed, pounce instantly. "Stop everything and caucus," says John Keith, vice president of MIS at Bestfoods North America in Englewood Cliffs, N.J. "Let the vendor know you expect them to meet their commitments," says Barney Kantar, a procurement manager at Du Pont Co. in Wilmington, Del. Remind them that "if

continued on page 22



▼
"Assign only one point of contact from within your organization, then ask, 'What can we do to help you help us?'" — Ron Griffin, Home Depot Inc.

EMERGING COMPANIES 2000



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"The first dozen or so customers of a Silicon Valley company are rolling the dice." – Dick Hudson, Global Marine Inc.



▼
"Let the vendor know you expect them to keep their commitments." – Barney Kantar, Du Pont Co.

continued from page 21

they want future business, we will make future decisions on future performance."

If there are scalability and other technical problems, "give the vendor a chance to correct the problem, and if it can't be done, exercise your right to the code and then make it more scalable," says Ron Griffin, CIO at The Home Depot Inc. in Atlanta. Conduct detailed technical analysis with them, and show them how to fix the problem. If problems continue, executives advise that you hold payment hostage.

You can also prime the pump by playing the reference account card. "Small companies value you more as a reference site [than big companies do]. If they can't perform for you, they'll try. Make sure you continue to be a valued customer so they have something to lose if it doesn't go well," says Kathy Brittain White, CIO at Cardinal Health Inc. in Dublin, Ohio.

Offering to be a reference site is also one of Hudson's favorite techniques. Start-up vendors "tend to jump on that real quick. We get good support and products that way."

Strong relationships, of course, are de rigueur. Says Griffin, "Assign only one point of contact from within your organization, then ask, 'What can we do to help you help us?' Assign a person full time to be a virtual part of their staff, and put this person on-site for the vendor."

But the real ace-in-the-hole is the vendor's CEO; more than anyone else, he wants to succeed. So call him, not the regional service manager or anyone else, when the skies grow stormy. But don't call too early about a problem, warns Hudson: "Any CEO worth his salt will investigate to ascertain how much actual effort has been expended by both the customer and his troops to resolve the issue." But do call before the problem has become a lingering one.

"I've done it three times in the last 12 months, and it's caused an instant turnaround in events," Hudson says. In the case of the company that didn't quite get this "truth" notion, the chairman made amends. He fired the founder of the company and his two top managers and returned the offshore drilling company's money with interest.

Inevitable Problems

Beyond pure management problems, there are the technical ones. How common are problems with these companies' products? "It's probably the rule rather than the exception," says Griffin. "We assume every-

8 Ways Start-Ups Can Hurt You

1. No rules. Start-ups often want to start work without a written contract and to keep working without formal documentation or schedules. The reason? "Small, inexperienced companies usually don't have the ability to produce a good proposal outlining what exactly they will do," according to Eric Esperne, purchasing manager at MCI WorldCom.

2. Poor support. Problems range from naïveté about what it takes to fill customer requirements to underinvestment in support to an inexperienced staff. Because the emerging company is undercapitalized, support/service may go by the wayside as it chases the next deal, says Ron Griffin, CIO at Home Depot.

3. Business immaturity. A lot of miscellany here: Sacrificing long-term relationships to satisfy investor pressures for quick gains. Not understanding how to work with large multinationals. Overextended CEOs and vice presidents who double as project managers. Treating your company as the quality control. "You think you are buying functionality, but in reality you are helping to deliver functionality for their product," says John Keith, vice president of MIS at Bestfoods North America.

4. Overinflated expectations. Innovators usually expect that their product will offer more value and command higher prices than it actually does. "Often, start-ups think all they need to do is advertise their solution in the marketplace, and people will come," says Barney Kantar, a procurement manager at Du Pont.

5. Cash now. These firms are often undercapitalized, so they ask for money before anything is delivered. That gives you less leverage when they fail to deliver later on.

6. Underwhelming performance. Lack of scalability, new releases that don't work properly and an inability to integrate with existing systems are frequent problems. "The small mom-and-pops don't have integration components. ... We have to write those tools ourselves," says Michael Anderson, vice president of IS at Home Depot.

7. Clueless lawyers. Start-ups often rely on outside legal counsel, and these attorneys aren't always experts on IT contracts. "The customer ends up educating the attorney on how to do business in the market," observes Kantar.

8. Limited talent. Emerging companies usually depend on a handful of key technologists. If they leave, you're in trouble: Their knowledge probably wasn't transferred to the staff, explains Anderson.

— Allan E. Alter

one we are dealing with is a hacker."

Delays and technical snafus are common. Griffin recalls a time when it took a year and a half to two years, instead of six to nine months, to deliver code. Had he made sure the vendor had the right technical architecture in place, he says, he would have realized that the technology would flop.

IT executives also say to watch out for scalability and support. "[Scalability is] the No. 1 issue that cropped up," White says.

Griffin says, "We will process 1 billion customers through our registers and 50 billion transactions internally. A lot of these folks don't have the environment" to develop systems that scale. And when it comes to support, you may find the vendor lacking. "Once you are a customer, you're left to your own devices," Hudson says.

If you're a large, multinational company, it's especially hard for these firms to work well with you. There's a support gap: They're usually not prepared to provide

global 24-hour support. The landscape inside a large multinational is often terra incognita. Entrepreneurs often don't understand the concerns of large companies.

And sometimes, the entrepreneur's naive self-confidence crosses the line into misrepresentation and even deception. Hudson recalls a time in 1995 when he caught a vendor's support staff in a bald-faced lie: Hudson had been told his company was the only one having the problem. He found out otherwise, talking to another customer he met at a Little League game. "They had been lying to us for four months," Hudson says.

So remember this the next time an emerging company has you starry-eyed: Working with start-ups has its rewards, but it has big risks, too. "The first dozen or so customers of a Silicon Valley company are rolling the dice," says Hudson. And that's the truth. ▀

Alter is Computerworld's columns editor and department editor, managing.

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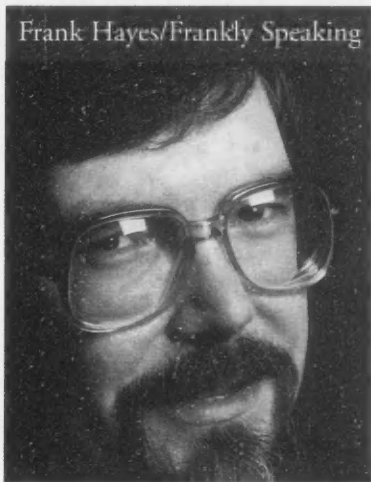
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Frank Hayes/Frankly Speaking



Emerging Companies: Making Winners

Let's cut to the chase here: What makes a winner?

Who's going to be the next Microsoft, the next Netscape, the next Palm Computing? We want to know because the winners will be the companies that define the next generation or two of information technology. If you can spot what makes a winner, you've got a front-row ticket to the future of IT.

I can't tell you which emerging companies will win big. Neither can any other pundit or consultant or industry blowhard. Funny thing is, that doesn't matter. What will matters is identifying which emerging vendors and products and technologies will give your company a competitive edge — will make *you* a winner.

So how do you figure *that* out? You know the drill: You need products that will do something useful for your organization, from companies that won't collapse or suddenly change direction and leave you orphaned. A little research, ordinary due diligence, will tell you who makes the first cut on your own list of emerging companies.

Then comes the tricky part. Because whether a product will be a winner or loser for your IT shop depends less on the product or technology and more on how you put it into play.

Start out by thinking both bigger and smaller. Think bigger in terms of the return you expect to get. You're taking a risk on a

new product, an untried technology. Don't make it a gamble with a low payoff. Look for ways to get a major advantage over your direct competitors. You want to leapfrog the competition, not inch ahead of it.

Think smaller in the new technology's scope of impact. You want a big improvement in a specific, well-defined business function. That's where cutting-edge technology can make an important difference in cost and capability. Keep the focus small to make the impact big.

Next, be both more cautious and more aggressive. Don't take chances alone on this already risky technology play. Get firm buy-in from the business managers who will eventually depend on it. Make sure you know exactly what they'll need and expect. Demand a clear picture of what the vendor will be able to deliver — and how fast you'll be able to put it into production. You don't want politics or misunderstanding to torpedo this one.

Test your pilot project hard. Kick it all over your IT shop, and make sure real users

can kick it just as hard. And nail down expectations, rollout plans, training plans, budget issues and executive sign-offs before anything gets a green light.

Then make it happen — *fast*. Don't let anyone turn it into a slow, leisurely rollout. You want a blisteringly aggressive transformation for what these users are doing. Remember, you're looking for business advantage and a quick payoff. The faster it comes out of the chute, the longer you'll have before your competitors catch up.

Finally, make this project both more open and more secret. Open up the decision-making process to include your business managers and users. Their support will make the difference between success and failure — or indifferent acceptance that barely justifies the cost, effort and risk of emerging technology.

But keep your implementation plans hidden from the outside world — especially your competitors. Don't blab to reporters or let your name go out as a reference customer.

True, not everyone buys in to secrecy as a tactic, and your company's reputation gets a boost from spreading the word early that you're cutting edge. But hot new technology is a secret weapon. Keep it under wraps until you're ready to spring it big.

And when you do, you'll already have made your own winner. ■

Hayes, Computerworld's staff columnist, has covered IT for 20 years. His e-mail address is frank_hayes@computerworld.com.

EMERGING COMPANIES 2000

100 Emerging Companies To Watch in 2000

Methodology: To identify and select emerging companies for the Top 100 special supplement, *Computerworld* invited companies to nominate themselves at our Web site, www.computerworld.com.

To qualify, companies were required to have at least 50% growth in the past two years and to have earned either \$1 million in revenue or received \$5 million in financing.

From May 1 through July 16, 560 nominations were received. *Computerworld's* panel of editors reviewed the description of each company's primary market focus, the segments in which the company competes

and the product descriptions. Editors then determined the 10 technology areas the emerging companies represented and grouped the nominations accordingly.

Selection of Finalists

Each *Computerworld* panel member was assigned a technology area and reviewed the nominations in that area. The panel selected 20 to 30 finalist companies in each area for the Emerging Companies 2000 list. Selection was based in part on the following criteria:

- The company has an innovative product or service.

- The company will have product shipping by year's end.
- The company has customer references.
- The company has a management team (not one person acting in many roles).

Nomination forms for the finalists in each technology area were sent to a panel comprising information technology industry influencers, including Robert Metcalfe, vice president of technology at International Data Group; Frank Gens, senior vice president of Internet research at International Data Corp.; Priscilla Tate, executive director of Technology Managers Forum Interna-

Company Name	Location	URL	Number of Employees	Year Founded	Founder	Public or Private	Product Names
APPLICATION DEVELOPMENT							
ChiliSoft Inc.	Bellevue, Wash.	www.chilisoft.com	42	1994	Charles Crystle	Private	ChiliSoft ASP, ChiliReports
Decisionism Inc.	Boulder, Colo.	www.decisionism.com	50	1996	Gordon Ratkin	Private	Active Decision Supportware, E-Commerce Analysis Suite, Active for Oracle Financial Analyzer
Embarcadero Technologies Inc.	San Francisco	www.embarcadero.com	60	1993	Stephen Wong, Stuart Browning, Cohen Weeks, Nigel Myers	Private	DBArtisan, EYStudio, Rapid SQL
Personify Inc.	San Francisco	www.personify.com	45	1996	Steve Krause, Adam Gross	Private	Personify Essentials, Personify Snapshot
Riverbed Technologies	Vienna, Va.	www.riverbedtech.com	31	1998	Wayne Jackson, Dave Rensin	Private	ScoutSync, ScoutIT, ScoutArchitect
BUSINESS PROCESS AUTOMATION							
Augeo Software Inc.	San Jose, Calif.	www.augeo.com	75	1991	Eric Montiel	Private	Augeo Intelligent Planner
Documentum Inc.	Pleasanton, Calif.	www.documentum.com	600	1990	Howard Shao, John Newton	Public	Documentum 4i, Documentum Innovation Application Series
Enovia Corp.	Charlotte, N.C.	www.enovia.com	250	1998	Bernard Charles-Dassault	Private	ENOVIA/PM, ENOVIA/PM
Envive Corp.	Mountain View, Calif.	www.envive.com	75	1996	Charlie Koo	Private	Service Level Manager (SLM), Stopwatch Pro, Inspector
Evoke Software Corp.	San Francisco	www.evokesoft.com	44	1996	Lacy Edwards	Private	Migration Architect, MA/Extract for VSAM
HAHT Software Inc.	Raleigh, N.C.	www.haht.com	150	1995	Rowland Archer	Private	HAHT Application Server, HAHT e-Scenarios, HAHT Integrated Development Environment
iClick Inc.	Ardley, N.Y.	www.iclickinc.com	50	1996	Rosalie Bacarella	Private	iClick Action Network
Intelligent Systems Technology Inc.	Santa Monica, Calif.	www.intelystech.com	10	1994	Dr. Azad M. Madni	Private	ProcessEdge Enterprise Suite, Solution Consulting Services, R&D Services
Motive Communications Inc.	Austin, Texas	www.motive.com	85	1997	Scott Harmon	Private	Motive Dual, Motive ActiveLink
webMethods Inc.	Fairfax, Va.	www.webmethods.com	100	1996	Phillip Merrick	Private	webMethods B2B, webMethods B2B for R/3
CONSULTING AND SERVICES							
Augen Consulting Inc.	Rolling Meadows, Ill.	www.asp.com	31	1993	Stewart Booden, Stephan Meon	Private	E-Commerce Enterprise Storage Management, Staff Augmentation Services
Edymion Systems Inc. (ESI)	Oakland, Calif.	www.esicom.com	125	1998	Fred Phares, Steve King	Private	SAP BW Implementation, PeopleSoft EPM Implementation, I-commerce-ERP Integration
Foslive.com	Deerfield Beach, Fla.	www.foslive.com	72	1996	David Finkelstein	Private	Web-enabled business solutions, E-commerce application development, Middleware and object framework development
Netlumina Solutions Inc.	Charlestown, Mass.	www.netlumina.com	25	1997	Imran Sayeed, Anish Dhandia and Greg Sabatino	Private	VIEW Methodology, Co-development, Knowledge sharing and knowledge transfer
Viridian Technologies Inc.	Boxborough, Mass.	www.viridian.com	70	1997	Dan Sierra	Private	RAP, QoS Control
CUSTOMER CARE AND SUPPLY-CHAIN MANAGEMENT							

tional; Howard Anderson, president of The Yankee Group; Peter G. W. Keen, chairman of Keen Education; and Charles Feld, CIO at Delta Air Lines Inc. We asked the panel of IT influencers to rate the finalists on the following characteristics:

- The company and its technology offer demonstrable value to corporate IT operations in Fortune 1,000 companies; the product or service addresses problems or challenges that IT managers face.
- The company is innovative, the product or service presents a new and creative approach to an IT issue and the product or service competes in a relatively new or emerging market.
- The company demonstrates an ability to execute its strategy in terms of revenue, revenue growth, funding and its management team.

These scores were totaled for each category. Companies with the highest scores in each category were selected for the Emerging Companies 2000 list.

Note: Some companies in this survey underwent acquisitions:

- Abuzz was acquired by The New York Times.
- Cerent Corp. was acquired by Cisco Systems Inc.
- Netpodium Inc. was acquired by Intervu Inc.
- iPivot Inc. was acquired by Intel Corp.

Primary Market Focus

Internet applications development software

OLAP analytical applications and data marts development software

Software for development of database applications

Online marketing, Web data mining and decision support applications

Enterprise data exchange applications between handheld devices and corporate networks

Professional services automation

Content management tools

Application development management

Application and service-level management software

Data Profiling and Mapping solution

Provides applications, services and platform to extend enterprise business systems to the Web

Web-based employee and manager self-service and enterprise portal solutions

Enterprise process support, decision support, and self-paced instruction technologies

Automated support chain solutions

XML-based solutions for business-to-business e-commerce

E-commerce application development

Operations management

Browser-based enterprise software products and solutions

Architecture, middleware and custom development services for e-business solutions

Consulting services

I/O Software Against the World of Hackers

In 1991, I/O Software Inc.'s founder and CEO, William Saito, realized that although many security devices existed, well-integrated biometric security applications were scarce. Saito, a medical school graduate turned high-tech guru, diagnosed the scarcity as an opportunity. Four years later, in 1995, Saito remedied the problem when he unveiled I/O Software's SecureSuite biometric security software at Comdex.

SecureSuite is the Riverside, Calif.-based company's set of security applications that use biometrics to provide secure log-on, screen saver unlocking, file and folder encryption and a single sign-on utility for Windows 95, 98 and NT users. Biometric security uses physical characteristics such as fingerprints, retinas and voice or personal behavior traits such as typing and keystroke patterns to verify a user.

And the biometrics proved the solution for California's Prison Industry Authority, which provides job training for inmates through a program in which they supply goods to state agencies. Its password-based system to PCs wasn't doing the job. "Inmates were not keeping their passwords to themselves," says David Escobar, information technology manager. "With SecureSuite, we can use fingerprint devices to control access to PCs and further control which applications users can access and what rights they have."

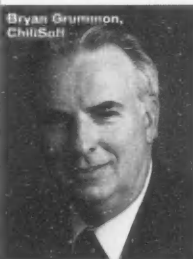
Escobar likes that the unit is self-contained. Fingerprint records and templates are stored within the device and not on the PC. SecureSuite takes only two seconds to scan fingerprints, recognize them and then grant or deny access to the PC.

The Top 12 PC manufacturers will be incorporating authentication features into PCs within the next 12 months, according to Saito, who says 1999 "has really been a kick-start year. Security is moving to the forefront of IT managers' minds." I/O Software's business has grown from 10,000 user licenses in 1998 to 100,000 user licenses this year. Revenue has climbed steadily since the company first reached profitability in 1994, growing more than 60% each year.

"I/O Software recognized and quickly grabbed hold of a good niche," says Julian Ashburn, former deputy at the Association of Biometrics in London. "The company listens to users and integrates customer feedback in their product." Ashburn likes I/O's approach to security and its ability to quickly deliver well-thought-out products.

— Lorraine Cosgrove

William Saito,
I/O Software



Bryan Grummon,
ChiliSoft

ChiliSoft's Open to All Systems

ChiliSoft Inc.,

founded in 1994, considers itself a 2-year-old start-up. After struggling three years with limited financing raised from the family and friends of founder Charles Crystle (now vice president of

applications), ChiliSoft in 1997 sought venture capital to develop an Active Server Pages (ASP) engine to vie with Microsoft Corp., which developed ASP.

The Bellevue, Wash.-based company so far has raised \$5 million in venture capital and plans to raise \$15 million more this year through a private placement, says Bryan Grummon, president and CEO. ChiliSoft ASP (now in Version 3.0), has been on the market for a year. Revenue is expected to double this year from just under \$1 million last year.

ASP is a simplified way of adding content to a site. For example, Grummon says a ChiliSoft ASP Web application for 401(k) information would work this way: The application would accept requests for personal data, assemble information from multiple sources and format the pieces into a single view.

Roy Alston, a graduate student in charge of an

ASP project at Texas A&M University in College Station, Texas, says ChiliSoft's ASP engine saves him time in his part-time role as a university Web page programmer. "ASP is a more straightforward way to open the database, sort it or add and delete data," than using HTML or text files, he says. Alston bought ChiliSoft's engine because it worked with a piece of third-party software the school wanted to use.

Unlike Microsoft's ASP, which runs only on different versions of Windows, ChiliSoft ASP 3.0 runs on IBM's AIX and Sun Microsystems Inc.'s Solaris, Grummon says. HP-UX and Linux versions are due by year's end, and an AS/400 version is due next year.

Eric Schmitt, an analyst at Forrester Research Inc. in Cambridge, Mass., says ChiliSoft is betting that Web sites will continue to use ASP. But in the long run, "they need an alternative story, a Java story," says Schmitt.

Grummon says ChiliSoft ASP 3.0 does have a limited "Java story" because it can access data from Java applications. But he says he sees no need for ChiliSoft to have a Java-specific ASP product that could work with Java Server Pages. "I assume that both Microsoft and Sun will be around, and we'll need to be compatible with both."

— Steve Alexander, a freelance writer in Edina, Minn.

EMERGING COMPANIES 2000

Company Name	Location	URL	Number of Employees	Year Founded	Founder	Public or Private	Product Names
BroadVision Inc.	Redwood City, Calif.	www.broadvision.com	300	1993	Pehong Chen	Public	BroadVision One-To-One Commerce, BroadVision One-To-One Financial, BroadVision One-To-One Knowledge
CommercialWare Inc.	Natick, Mass.	www.commercialware.com	80	1999	Donny Askin	Private	Mozart
EC Cubed Inc.	Wilton, Conn.	www.eccubed.com	90	1996	Faisal Hoque	Private	ecDataBuilder, ecProfiler, ecWorkRouter
Kana Communications Inc.	Palo Alto, Calif.	www.kana.com	130	1996	Mark Ganey	Private	Kana CMS
RightPoint Corp.	San Mateo, Calif.	www.rightpoint.com	75	1994	N/A	Private	Real-Time Marketing Suite
Synchrony Communications Inc.	Cincinnati, Ohio	www.synchronyinc.com	45	1997	Mark Richey	Private	The Synchrony Solution
Vignette Corp.	Austin, Texas	www.vignette.com	480	1995	Ross Garber, Neil Webber	Public	StoryServer, Vignette Syndication Server, Vignette Development Center
E-COMMERCE							
Accrue Software Inc.	Fremont, Calif.	www.accrue.com	52	1996	Bob Page, Jonathon Nelson	Private	Accrue Insight 3.0, Accrue Site Knowledge, QuickBridge for Vignette StoryServer
Andromedia Inc.	San Francisco	www.andromedia.com	100	1995	Kent Godfrey	Private	LikeMinds Personalization Server, ARIA, ARIA e-commerce
ClearCommerce	Austin, Texas	www.clearcommerce.com	120	1996	Julie Ferguson, Riss Estes	Private	Merchant Engine, Hosting Engine
EdgeNet Inc.	Brentwood, Tenn.	www.edgenetmedia.com	26	1993	Tim Chaste	Private	m2o Configurator System, Community Development Kit
Extricity Software Inc.	Redwood Shores, Calif.	www.extricity.com	95	1996	Ken Ross, Greg Olsen	Private	Extricity AllianceSeries, Extricity AllianceInteract E-business Process Solutions
FaceTime Communications Inc.	Foster City, Calif.	www.facetime.net	38	1997	David Hsieh, Mehdi Maghsoodnia	Private	FaceTime Message Exchange, Instant Messaging Management, Email Management
FreeMarkets Inc.	Pittsburgh	www.freemarkets.com	210	1995	Glen T. Meakem, Sam E. Finney	Private	Custom online real-time bidding events
Intellisys Electronic Commerce LLC	New York	www.intellisys.com	110	1996	Robert Barnes	Private	IEC-Enterprise, IEC-Link, B2Boramp
Intraware Inc.	Orinda, Calif.	www.intraware.com	200	1996	Peter Jackson, Paul Martinelli and Mark Hoffman	Public	SubscribeNet, intraware.shop, Intraware IT Knowledge Center
Media Solutions International Inc.	Roswell, Ga.	www.msi-usa.com	30	1993	Roy W. Oliver	Private	Net-Compass Parts & Service System Suite, Net-Compass Product Support Service, Net-Compass Warranty System
Netcentives Inc.	San Francisco	www.netcentives.com	160	1996	Eric Tilenius, Elliott Ng	Private	ClickRewards, ClickRewards@Work, Loyalty Networks
OnDisplay Inc.	San Ramon, Calif.	www.ondisplay.com	85	1996	Mark Pine, Trung Dung	Private	CenterStage eContent, CenterStage eIntegrate, CenterStage eBioXchange
Perceptual Robotics Inc.	Evanston, Ill.	www.perceptualrobotics.com	15	1995	Paul Cooper	Private	Look and Buy, Interactive Telepresence Software
RoweCam Inc.	Cambridge, Mass.	www.rowe.com	126	1994	Richard Rowe	Public	iStore, iLibrary
Sales Vision Inc.	Charlotte, N.C.	www.salesvision.com	60	1994	Tom Fedell, Robert Kear, Karl Johnson and Wells Tiedeman	Private	Jsales, SalesPortal
Vastara Inc.	Dulles, Va.	www.vastara.com	175	1992	Arjun Rishi, George Bardos	Private	Global Passport (Formerly known as EMS 2000)
WebLine Communications Corp.	Burlington, Mass.	www.webline.com	100	1996	Fedaus Bhathena	Private	WebLine Collaboration Server, WebLine Media Blender
Webridge Inc.	Portland, Ore.	www.webridge.com	80	1996	Gary Fiehlend, Mark Anastas	Private	Mainspan Partner Relationship Management System, Mainspan 2.0
INFORMATION AND KNOWLEDGE MANAGEMENT							
Abuzz	Cambridge, Mass.	www.abuzz.com	34	1996	Andy Sack	Private	Beshive
Arial Systems Corp.	Vernon Hills, Ill.	www.arialsystems.com	30	1996	Tom Pirelli, Jim Allard	Private	ArialView PSD, ArialViewIR Total Access Network, ArialVoice browser
Artesia Technologies	Rockville, Md.	www.artesiastech.com	60	1999	Chris Vestor	Private	TEAMS
Autonomy Inc.	San Francisco	www.autonomy.com	70	1996	Mike Lynch	Public	Portal-in-a-Box, ActiveKnowledge, Knowledge Update (and Alert)
CorVu Corp.	Edina, Minn.	www.corvu.com	120	1993	Justin Macintosh	Private	CorVu Balanced Scorecard Solution, CorVu Web Server, CorVu Enterprise Business Performance Management Suite
Manager Technology Inc.	San Rafael, Calif.	www.manager.com	80	1996	Michael Rotschild	Private	The Manager System
Open Text Corp.	Waterloo, Ontario	www.opentext.com	700	1991	Frank Tompa, Gaston Bonnet and Tim Bray	Public	LiveLink, BASIS/TechLib, OnTime
Revelwood Inc.	New York	www.revelwood.com	35	1995	Ken Wolf	Private	SmartSite
The docSpace Co.	Menlo Park, Calif.	www.docspace.com	80	1997	Evan Chrapko	Private	docSpace Express, docSpace Drive, docSpace Direct
NETWORK AND COMMUNICATIONS MANAGEMENT							
Alliga Networks	Franklin, Mass.	www.alliga.com	58	1998	Mark Fietas	Private	Alliga C50, Alliga C20, Alliga C10 VPN Concentrator Series
Cerent Corp.	Petaluma, Calif.	www.cerent.com	175	1997	Ajib Bhadani	Private	Cerent 454
Cobalt Networks Inc.	Mountain View, Calif.	www.cobaltnet.com	104	1996	Mark Orr, Gordon Campbell, Mark Wu and Vivek Mehra	Private	CacheRaQ 2, Qube 2, RaQ 2
Concord Communications Inc.	Marlboro, Mass.	www.concord.com	175	1994	C. Kenneth Miller	Public	Network Health
eFusion Inc.	Beaverton, Ore.	www.efusion.com	75	1996	Ajit Pendse	Private	eStream, eBridge
FS Networks Inc.	Seattle	www.fs.com	170	1996	Jeff Hussey	Public	FWA-100, 300MS, global/SITE

Primary Market Focus

Customer Relationship Management

Order management and fulfillment software

Customer relationship management

Enterprise-class Internet customer communications products

Real-time marketing

Customer relationship management

Enterprise products for building businesses online

Enterprise-class e-business analysis software and services

E-marketing software

Internet commerce transaction software

E-commerce application deployment tools

Business-to-business integration applications

Internet-based customer interaction software

Business-to-business online market applications

Internet-based procurement products

Internet-based services

Automation software for automated parts, service, warranty, diagnostics and communications management

Online rewards and loyalty programs

Application suite for rapidly deploying e-business portals

Telepresence software products

Web-based services to manage the acquisition of knowledge resources

Java-based applications, portals and development tools

Products for international trade logistics

Interactive e-commerce and Internet customer service software

Tools for partner relationship management

People-based intellectual capital management software

E-Service collaboration tools

Digital asset management products

Knowledge management and new media publishing

Integrated business intelligence and business performance management products

Advanced profit analysis software

Collaborative knowledge management tools

Online Analytical Processing Application

Web-based applications for file delivery, storage and collaboration

Software to build virtual private networks

Tools to build and transition to data-intensive fiber-optic networks

Network communication software

Automated network reporting

Internet tools that enable enhanced interactive communications

Internet traffic management

Evoke Software: Quality and Speed

Evoke Software Corp.'s product, Migration Architect, analyzes data in a fraction of the time it would take to do so manually. Most important, it gives companies a tool to create high-quality data.

"I've been stung by data quality," says Ralph Nordstrom, data warehouse architect at the Automobile Club of Southern California in Los Angeles. "You're really not going to get anywhere with data warehousing without high-quality data."

Migration Architect allows database analysts to understand exactly what's in their database by looking at every detail of the data. It examines every row and column of a database and all aspects of the data, from behavior patterns to rates of change.

"It will catalog each value," says Nordstrom. "We ran it through our database and found a field called 'fishing,' but when we looked at the data, we found Social Security and alien ID numbers. We don't sell fishing licenses anymore, so the programmers used that field for the Social Security numbers of people who buy traveler's checks."

San Francisco-based Evoke's product also saves database analysts countless hours of time. "With Evoke, what would take four to six hours per data element to analyze can now be done within 15 to

30 minutes, and it catalogs the data," Nordstrom says.

"The tool makes it easy to look at all the data for the time they would normally spend looking at one attribute," agrees a data analyst at a major telecommunications firm in California.

"It allows you to look at your legacy data so that you can look at all the real data, not just the meta-data," says CEO Lacy Edwards, who co-founded Evoke in December 1996. "For example, a database could have my name in one record as Lacy Edwards and another as Ledwards. Migration Architect allows you to see this and understand the data better."

"[Migration Architect] enables us to do a lot of stuff we just wouldn't have done — things we gave up on," says the telecommunications company analyst.

But Evoke's customers aren't the only happy ones. With an expected \$10 million in revenue this year compared with \$4 million last year, "I'm pleased," says Edwards. — *Joyce Chutchian, a freelance writer in Concord, Mass.*



Lacy Edwards,
Evoke Software

CommercialWare's Customer Focus

The J. Jill Group Inc., an upscale women's apparel retailer, prides itself on its customer service and order management. The retailer has direct ties among its catalog, online and retail stores that include real-time inventory and order entry among other features, thanks to Mozart, a consumer marketing software tool from CommercialWare Inc.

With Mozart, Tilton, N.H.-based J. Jill has a direct feed into its order processing system, which allows the retailer to give instant customer service. When customers order online, they can quickly change their order by contacting customer service via phone, fax, e-mail or by visiting a retail store.

CommercialWare spun off in March from its parent company, ASA International Ltd., a Framingham, Mass.-based vertically oriented software holding company, and expects to double its size from 53 employees in March to 110 employees by year's end. And since the arrival of CEO Bill Colt, the company has seen sales revenue grow from \$11 million last year to an expected \$20 million this year.

Its secret to success? "We're not just focused on e-commerce," says

Donny Askin, senior vice president and founder of the Natick, Mass.-based company. "We're taking what was a small niche — catalog direct marketing — and making it horizontal by creating a multi-channel approach, whether it be via phone, fax, the Web or mail."

This approach is done through Mozart, which ties customer information in real time to a built-in infrastructure that handles direct-to-consumer information. By providing the tools for the back-end integration of marketing, customer service, accounting and fulfillment, Mozart allowed J. Jill to expand its retail catalog company by adding a fully integrated Internet store as well as retail stores. "[CommercialWare] has taken a call management system and

has retrofitted that to the e-commerce industry," says Randy Dow, J. Jill's vice president of IS.

What led Dow to CommercialWare was the 10 to 15 years of experience before its spin-off earlier this year. "They actually redesigned a brand new catalog system from scratch, rather than remodeling an existing product. They know this industry well," Dow says. — *Joyce Chutchian*



Donny Askin,
CommercialWare

EMERGING COMPANIES 2000

Company Name	Location	URL	Number of Employees	Year Founded	Founder	Public or Private	Product Names
GRIC Communications Inc.	Milpitas, Calif.	www.gric.com	150	1994	Huang Chen	Private	GRIC CSP, GRICraveler, GRICphone
Quailaby Corp.	Burlington, Mass.	www.quailaby.com	56	1997	Yves Charles	Private	PROVISO, PROVISO Library
Segue Software Inc.	Lexington, Mass.	www.segue.com	282	1988	N/A	Public	LiveQuality EEMIS, SilkPerformer, Silk Observer/Silk Pilot
System Management Arts Inc. (SMARTS)	White Plains, N.Y.	www.smarts.com	43	1993	Silvaia Yemini	Private	InCharge Applications
SYSTEM MANAGEMENT AND SECURITY							
3-G International Inc.	Springfield, Va.	www.3gi.com	130	1991	Tom Gregg	Private	Passage Enterprise and Passage Government, Passage Desktop, Passage Services
Appliant Inc.	Seattle	www.appliant.com	50	1997	Brian Bershad	Private	Appvisor for Microsoft
Aventail Corp.	Seattle	www.aventail.com	110	1996	Evan Kaplan, Chris Hopen and Derek Brown	Private	Aventail ExtraNet Center
Chain Link Technologies Inc.	Sunnyvale, Calif.	www.clti.com	85	1995	Raj Jain, Rini Duraiswamy and Nick Fergus	Private	App's Integrity, IS*Integrity, Object* Migrator
I/O Software Inc.	Riverside, Calif.	www.ioftware.com	39	1991	William Saito	Private	SecureSuite
Online Technologies Group Inc. (d/b/a OTG Software)	Bethesda, Md.	www.otg.com	151	1992	Richard Kay	Private	ApplicationXtender, DiskXtender, WorkflowXtender
teamshare Inc.	Colorado Springs	www.teamshare.com	37	1997	Kevin Dietz	Private	teamtrack, teamtrack on-line
Technauts Inc.	Cary, N.C.	www.technauts.com	25	1997	Ravi Periasamy	Private	eServer.net, eServer.mail, eServer.share
TECSEC Inc.	Vienna, Va.	www.tecsec.com	12	1990	Edward M. Scheidt	Private	eAccess, Private Office
XIOtech Corp.	Eden Prairie, Minn.	www.xiootech.com	65	1995	Philip Soran, Larry Aszmann and John Gunder	Private	MAGNITUDE, REDI Copy, REDI Access
WEB APPLICATIONS							
Agile Software Corp.	San Jose	www.agilesoft.com	160	1995	Bryan Stolle	Private	Agile Anywhere, Agile eHub, Agile eXpress Viewer
AvantGo Inc.	San Mateo, Calif.	www.avantgo.com	50	1997	Felix Lin (co-founder)	Private	AvantGo 2.0, AvantGo.com, AvantGo We To Go
2order.com (formerly BT Squared Technologies)	Atlanta	www.2order.com	50	1991	Scott Geller	Private	2order iCE, 2order ISS
Centra Software Inc.	Lexington, Mass.	www.centra.com	82	1995	Leon Navickas	Private	Centra 99
DataSage Inc.	Reading, Mass.	www.datasage.com	55	1997	David Blundin	Private	DataSage netCustomer
Eloquent Inc.	San Mateo, Calif.	www.eloquent.com	98	1995	Clifford Reid, David Glazer	Private	Eloquent 4.0, Eloquent Professional Services, Eloquent Content Production
IT Factory Inc. (owned by IT Factory A/S)	Cambridge, Mass.	www.itfactory.com	95	1997	Lars M. Johansen	Private	ITF Software Development Kit, ITF Business Suite, ITF Plus Suite
Linguistic Technology Corp.	Littleton, Mass.	www.englishwizard.com	21	1994	Larry Harris	Private	English Wizard Client, English Wizard Add-in, English Wizard Software Developer's Kit (SDK)
Logility Inc.	Atlanta	www.logility.com	250	1997	Michael Edenfield	Public	Demand Chain Voyager, Voyager XPS, Event Planning
net.Geneus Corp.	Cambridge, Mass.	www.netgen.com	130	1995	Matthew Cutler, Eric Richard	Private	netAnalysis, netInstrument, Design for Analysis
Netpodium Inc.	Seattle	www.netpodium.com	30	1997	John O'Halloran, Mike Templeman	Private	Netpodium 2.0, Netpodium Event Hosting Services
Onset Technology Inc.	Santa Cruz, Calif.	www.onsettechnology.com	30	1997	Gadi Mazor, Ron Maor	Private	ThruFax, MetaFax
PointBase Inc.	San Mateo, Calif.	www.pointbase.com	22	1998	Bruce Scott	Private	PointBase Mobile Edition, PointBase Server Edition
Rubric Inc.	San Mateo, Calif.	www.rubricsoft.com	55	1997	Hal Steger	Private	Rubric EMA
USAData.com	New York	www.usadata.com	22	1997	Ric Murphy	Private	MarketTarget, PowerTarget, Internet Information Portal
WEB INFRASTRUCTURE							
Cloudscape Inc.	Chandler, Calif.	www.cloudscape.com	50	1996	Nat Wyatt, Howard Torf	Private	Cloudscape 2.0, Cloudsync, Cloudweb
Digital Island	San Francisco	www.digisle.net	210	1995	Ron Higgins	Private	TraceWare, Usage-based Pricing, Managed Bandwidth
Eprise Corp.	Framingham, Mass.	www.eprise.com	52	1992	Jon Radoff	Private	Eprise Participant Server
Freshwater Software Inc.	Boulder, Colo.	www.freshwater.com	8	1996	Donna Auguste, John Meier	Private	SiteScope, SiteSeer/Global SiteSeer
Idiom Technologies Inc.	Cambridge, Mass.	www.idiomtech.com	13	1998	Susan Cheng	Private	WorldServer
iPivot Inc.	San Diego	www.ipivot.com	72	1997	Brett Helm	Private	Intelligent Broker 7000, Commerce Director 8000, Commerce Accelerator 1000
OrderTrust LLC	Lowell, Mass.	www.ordertrust.net	130	1995	Tim Little	Private	Value-Added Services, Commerce Transaction Services, Network Services
Resonate Inc.	Sunnyvale, Calif.	www.resonate.com	100	1995	Chris Marino	Private	Resonate Central Dispatch, Resonate Global Dispatch, Resonate Commander
Sandpiper Networks Inc.	Thousand Oaks, Calif.	www.sandpiper.net	80	1996	Dave Fisher, Andy Swart	Private	Footprint 2.0
Vision Software Tools Inc.	Oakland, Calif.	www.vision-soft.com	147	1995	Naren Bakshi	Private	Vision JADE
WebTrends Corp.	Portland, Ore.	www.webtrends.com	100	1994	Oliver Boyd, Eli Shragina	Public	Enterprise Suite, Security Analyzer, Commerce Trends

Primary Market Focus

Internet value-added services for service providers (Internet service providers, telcos and emerging carriers)

Service-level management products

E-business management

Real-time network analysis applications for self-healing networks

Smart card applications for security

Application monitoring and measurement platform

Management and security solution for sharing data and applications over IP networks

IT process automation software

Information security software

Automated NT data access and storage management

Web-based, team-oriented productivity tools

E-mail, file and print services, firewall and Web services

Advanced encryption products

Virtualized, shared and software-based storage systems

Web-centric product content management software

Products to manage mobile information and extend enterprise applications to handheld devices

Enterprise software to automate sales, quotation and order management

Internet software for live training and business collaboration

Web-based data mining software

Web-based rich media business communications software

Notes/Domino development tools and Web-enabled application components

Natural language information access tools

Collaborative sales chain planning products

Web site measurement and analysis solutions

Interactive broadcasting and hosting on the Web

Automatic recognition products

Data management products

Enterprise marketing automation applications

Business-to-business e-commerce portal

Embeddable data management for e-business

Network services for globalizing e-business applications

Web site content management software

Web site performance monitoring

End-to-end Web globalization solutions

Intelligent Internet traffic management

Order life cycle management services for e-commerce

Distributed software for managing availability and performance

E-business content delivery tools and services

Business rule automation software for e-business

Internet and intranet server management and reporting software

Aventail Helps Customers Manage Business Communities



Evan Kaplan, Aventail

Aventail Corp.

was founded in 1996 in Evan Kaplan's living room with his two co-founders, Chris Hopen and Derek Brown. They envisioned a growing dependency on the Internet for business transactions that would extend the

boundaries of corporate networks to the outside world. With backgrounds in networking and TCP/IP and an initial \$750,000 in funding, mostly from private investors, Kaplan, Hopen and Brown set out to create an easy-to-use, open technology for securing and managing corporate networks and extranets.

Three years later, Seattle-based Aventail has 110 employees, 500-plus customers and 10 offices nationwide. Its product, Aventail ExtraNet Center (AEC) allows an organization to open its network resources to business partners and customers while maintaining a secure environment. Aventail's list of customers includes Bear, Stearns & Co., General

Electric Co., Morgan Stanley Dean Witter & Co. and Xerox Corp.

The client/server-based application provides the management, security and application and network integration needed to secure corporate extranets. Administrators can limit a user's access to one Web page, an application or a server, down to a specific day and even an hour. AEC is platform-independent and supports a variety of authentication methods.

Overlake Hospital Medical Center in Bellevue, Wash., uses AEC to push confidential patient information to physicians in the field in a secure fashion. The result is better-informed doctors, faster turnaround time for test results and higher-quality patient care.

Jeffrey Bernstein, Overlake's network engineer, researched mainstream virtual private network options before calling Aventail. "Aventail dispatched a service technician within a few days of our first conversation, and in one day, we were up and running," he says.

With \$10 million in funding from private investors, venture capital firms and business partner Hewlett-Packard Co., Aventail hopes to be profitable in 2000 and to double its sales force by year's end.

Aventail will soon launch a new service, Aventail.net, to provide extranet management services and training.

— Lorraine Cosgrove

Vignette Corp.'s StoryServer Manages Content

When Pete Mathews realized his online travel service site was at an 80% to 90% usage rate, with more than 1 million hits per day, he wasn't worried. The vice president of software development at Preview Travel Inc. was using Austin, Texas-based Vignette Corp.'s StoryServer, a Web content management tool that helps him deliver and maintain the agency.

Vignette's StoryServer offers a patented high-performance caching mechanism. It also offers support for major Web servers and relational databases that help high-volume Web businesses manage content and ensure rapid development, scalability and performance. Mathews turned to Vignette two years ago, when he was looking to bring Fodor's Travel Publications onto his site. "We manage travel sites for Preview Travel as well as for America Online, Lycos and other sites, so the same piece of content on our site needs to be co-branded for other sites," he says.

San Francisco-based Preview Travel provides airline tickets, car rentals, hotels, vacation packages and customer service 24 hours per day via e-mail and a toll-free number. It also offers integrated access to travel information, merchandise and news. StoryServer helps Mathews manage the content, workflow and customer relations of his online agency. "StoryServer helped us change dynamic components to

caching components, which allowed us to utilize at 10%," Mathews says.

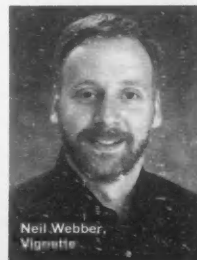
Founded in 1995 by Ross Garber and Neil Webber, Vignette is worth \$14.9 million and has 480 employees worldwide. For the quarter that ended in June, total revenue for the company increased 409% from \$2.9 million for the same period last year.

Vignette only recognizes revenue once a customer is live and deployment and services have been completed, says Webber, Vignette's chief technology officer. "We don't just move on to the next customer," he says. This was a big selling point for Mathews. "I was impressed with their revenue policy," he says.

— Joyce Chutchian



Ross Garber, Vignette



Neil Webber, Vignette

EMERGING COMPANIES 2000

EMERGING COMPANIES 2001?

Entrepreneurs of the future, take note.

Vincent Phillips, vice president of Web systems, Electronic Brokerage Technology group, Charles Schwab & Co., San Francisco



"Some sort of operating software that lets me write applications and have the presentation look the same on different devices without having to change the

application. It would look the same on a personal digital assistant, on a Web browser, on the AOL browser, on Linux — all devices and operating systems would handle the presentation, and I'd only have to write the application once."

Barbara Cooper, CIO and group vice president, information systems, Toyota Motor Sales USA Inc., Torrance, Calif.

"The ultimate would be a wireless IT environment — no more cable."

Peter Burrows, chief technology officer, Reebok International Ltd., Stoughton, Mass.

"It's still not efficient to support a desktop. If you're supporting thousands of desktops, it's still time-consuming and expensive, and all your users have different requirements."

"The bloatware that you have to put on every machine is still frustrating. Internet-based things like Sun's Star free desktop software hold a lot of promise."

"I'm also intrigued by the direction of general-purpose appliances and palmtops. We have employees in our warehouses operating these large scan-

ning devices. I'd like to see those devices built into helmets." **As we approach** the millennium, it seems that a lot of information technology executives are waxing nostalgic for a kinder, gentler IT environment. Looking forward, they often look back. When asked about the dream technologies they'd like to see emerging companies develop, their answers frequently reflected a desire for a more centralized, single-solution approach to end-user requirements. Some suggested that they don't even need any new technologies — just better use of the technologies already in place // **By Leslie Goff**

Chris Siragusa, CTO, Kozmo.com Inc., New York

"To be able to get data communications lines installed more quickly without all the headaches of dealing with the phone or cable company. It would involve a combination of having technology that allows them to set up and track lines quickly and a service philosophy of doing it fast."

"I want to get a T1 or frame-relay connection between two sites within a week. I have even waited 14 to 16 weeks to get a line installed. That's what prevents me from going online in more cities more quickly."

"I'd also like a really solid automatic Web site testing tool. I'd like a single solution that would show me all the probable problem areas at once."

Paul LaFort, CIO, United Health Group, Minneapolis



"Personal portal technology that would let users customize their own desktops each morning and change their preferences."

"We've had our intranet for five years, and we have over 300 Web sites built into it. And no one is interested in all of them. With personal portals, you could customize the information flow into large companies. The average person only needs 10% of the information coming in, and you could filter it

and have it pushed to you."

"It would take the Chinese menu approach: One day you could choose items No. 1, 4, 7 and 8, and the next day you could choose new ones and have those pushed to you so you don't have to crawl around the intranet."

Scott Abbey, CIO and executive vice president, PaineWebber Inc., New York



"We have a significant issue with the proliferation of servers to support large-scale applications. Most applications won't run well on a

server with other applications — you need dedicated servers. That is inconvenient to say the least. And each one needs its own fail-over gear."

"A set of technologies that would facilitate merging those into a smaller set of servers would be highly advantageous — a combination of hardware and software that would include more sophisticated I/O and higher-speed network connectivity. What I'm actually describing is a mainframe."

Jot Raskin, founder of the original Macintosh team, consultant and author, Pacifica, Calif.

"The dream technology that would make my life easier and the lives of millions of others easier would be to have a computer interface better than that dealt to us by Microsoft (or even by Apple). The jokes about how stupidly these GUIs are designed are endless: we know a disaster when we see one, yet these systems get larger, slower and more complex with every new release — forcing us to buy newer, bigger,

faster computers every time they sneeze."

"Too many companies for which I consult say that they want me to create a superior interface that will set them apart from the competition. But, they add, it has to follow the Windows guideline, and it has to be implemented in three weeks in Visual Basic. So it's an awakening of management that I dream of, and of working for companies that realize that if you make something the same, it won't be any better."

Jim Pravo, vice president and CIO, Green Mountain Coffee Inc., Waterbury, Vt.

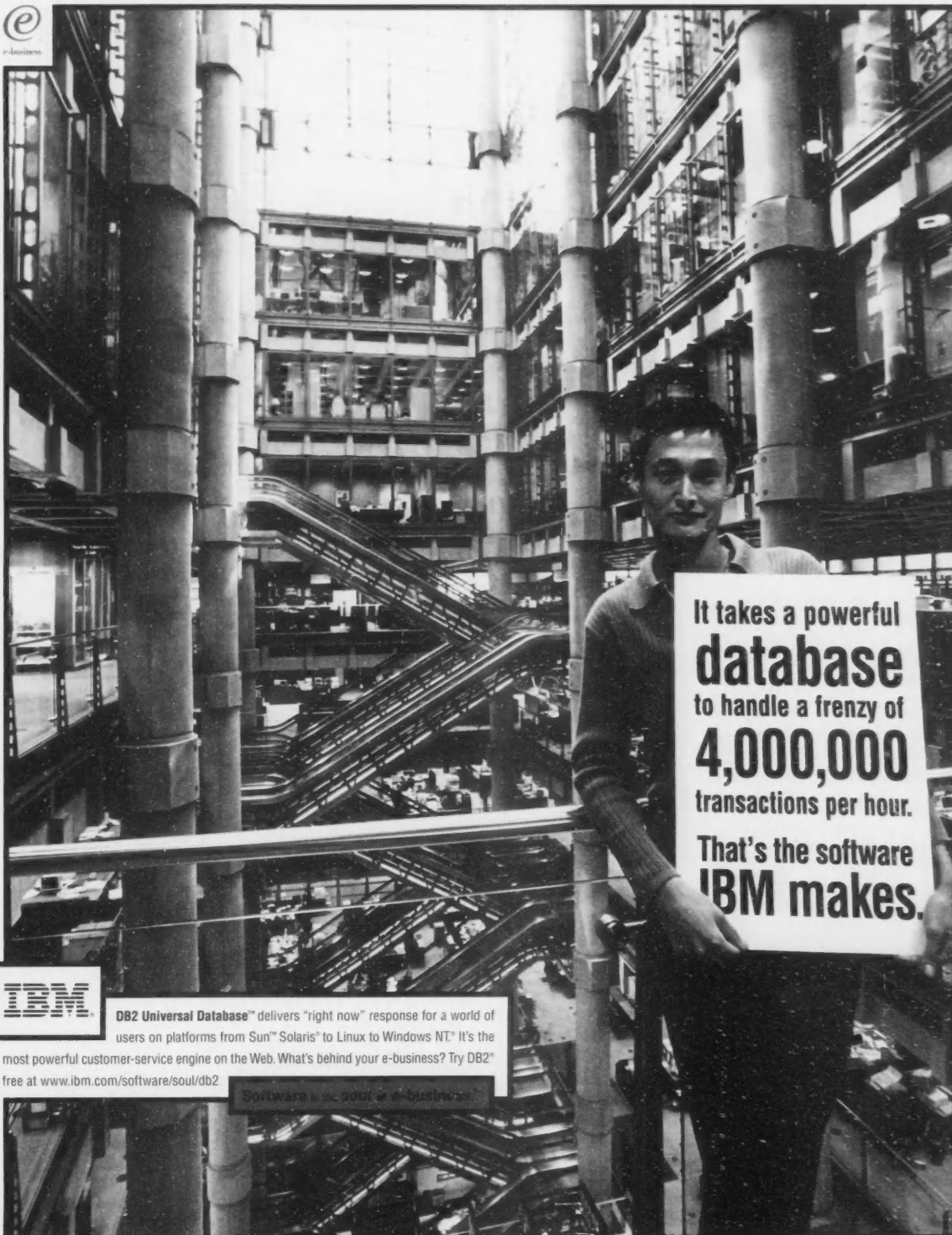


"The biggest gains would come from the appropriate application of the technologies that already exist. In the '70s we had desktop

devices that required virtually no setup or support for five years. Where are we now? Long setup times and applications that force the upgrade of the desktop PC every few years. We rushed to push all the computing to the desktop to save money. Now we rush to put it back on the server because it costs so much to maintain applications on desktops."

"I don't yearn for a technology-based magic pill to solve my problems. I'd like to put science and discipline back into the field of computers. We have mind-boggling technology at our disposal. We just need to use it more intelligently."

Goff is a freelance writer in New York. Contact her at lgoff@ic.netcom.com.



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TOP 10 RECRUITING TIPS

BY LESLIE GOFF How do you find IT professionals who will fit into your organization like a glove? And once you find them, what makes the difference between getting them on board and letting them slip through your fingers? The following are 10 ideas to help you snare that perfect programmer:

■ **Start Me Up: Create an "Entrepreneurial" Organization.** An entrepreneurial team will draw candidates who are stimulated by variety and challenge but drawn to corporate stability. Insurance firm The Hartford Financial Services Group Inc. in Hartford, Conn., established Hartford Technology Services (HTS), an internal information technology consulting arm separate from its main IT staff. In less than two years, HTS recruited 85 people, including 16 who joined from Big Six consulting firms. "This is one way of recruiting a different kind of person, with a certain kind of personality and skill set," says Mike Wilkinson, director of HTS.

The consulting group has also been a useful recruiting tool for Hartford's main IT group: Of the 85 recruits, 24 have gone on to take IT positions in various Hartford business units.

■ **Establish an Alumni Network.** Stay in touch with your employees after they leave; they might want to come back or might send you a future CIO. At exit interviews with departing IT staffers, Hartford secures permission to conduct follow-ups three months, six months and one year after they leave, "to see if they're still liking their new job," says John Madigan, head of IT recruiting.

■ **Employee Referral Bonuses: Get the Word Out.** It's one thing to have an employee referral bonus; it's another to make sure employees remember it. "The mistake many companies make is only saying it once; it becomes just another page in the employee handbook," says Scott Dinsdale, executive vice president and chief technology officer at FirstLook.com, an online music site based in Los Angeles. Post notices every other month to remind people.

Vivi Fenwick, a human resources representative at General Magic, benchmarked 10 Silicon Valley-area employers and found that companies that trumpeted the horn recruited 40% to 60% of new hires through current employees. Those that didn't filled only 15% to 20% of openings that way. General Magic, a Sunnyvale, Calif., developer of voice-enabled services, has made 43% of its 1999 hires through employee referrals.

■ **Relocation as a Tool: Baby, Let's Play House.** An outstanding relocation package can be a deal-maker, IT managers say. It's not just the expenses you cover; it's how involved you get.

"We assess what is going on in the candidate's life," says Eileen Cassini, director of IT services at hotel and casino chain Harrah's Entertainment Inc. in Memphis. "If they have a wife in the latter stage of a pregnancy, that can be a huge hurdle to overcome." In such a case, Cassini would assign someone to help the spouse find a new doctor and hospital. "We work on the move in a very holistic way," she says.

■ **Print Ads: One More Time, With Feeling.** Brand your IT recruiting effort. Airborne Express launched a series of IT job ads with the tagline "Overnight Heroes," says Lisa Reinitz, manager of recruiting for the company's Information Technology Services group. The ads put a human face on Seattle-based Airborne's IT organization by featuring photos of real people and incorporating "humor and whimsy" with statements like, "We're looking for the King of Network Warriors." Reinitz says she now receives several hundred responses, compared with only 20 to 25 before the ads ran.

■ **Engage Your Executives.** Get your top IT executives and corporate bigwigs involved.

Tom Hardin, executive vice president of worldwide operations at start-up Send.com, an online gift-buying service in Waltham, Mass., was recruited from L. L. Bean Inc. He says he was attracted to Send.com in part because he met staff and executives during his on-site interviews. "It's a great thing when you can talk to people at all levels of the business, from the CEO to VPs and managers, and everybody is on the same wavelength," he says. "That's really important in recruiting."

■ **Net Candidates on the Net.** Using the Internet to find job candidates is a no-brainer; the trick is using it to "find people that lots of other companies haven't also talked to," says Bill Craib, director of training at Advanced Internet Recruitment Strategies in Hanover, N.H. That can be frustrating and time-consuming, but Craib recommends some shortcuts.

For example, if you want to mine a competitor for SAP analysts, zero in by typing "host:" followed by the domain name; couple it with the X-ray command "title:SAP analyst." You'll get links to Web pages containing employee listings that may be hidden from easy view.

■ **Web-Based Advertising: Put Yourself Out There.** Don't just post job openings on the Web; create a compelling jobs page that gives your IT staff an identity and imparts a sense of what working for your company is like, Craib says. Enable a direct connection with your company; placing a résumé-builder on the Web site is effective, Reinitz says. Airborne receives about 90% of its résumés that way.

■ **Act Fast.** Move at Net speed. "The hiring process is as much as 20 days shorter now than it was before the Internet," Craib says. "You have to get the whole thing turned around in no more than three weeks."

Respond to a résumé in 24 hours, and make use of technologies that can speed along the interview process, like Web conferencing for out-of-town candidates, Craib recommends.

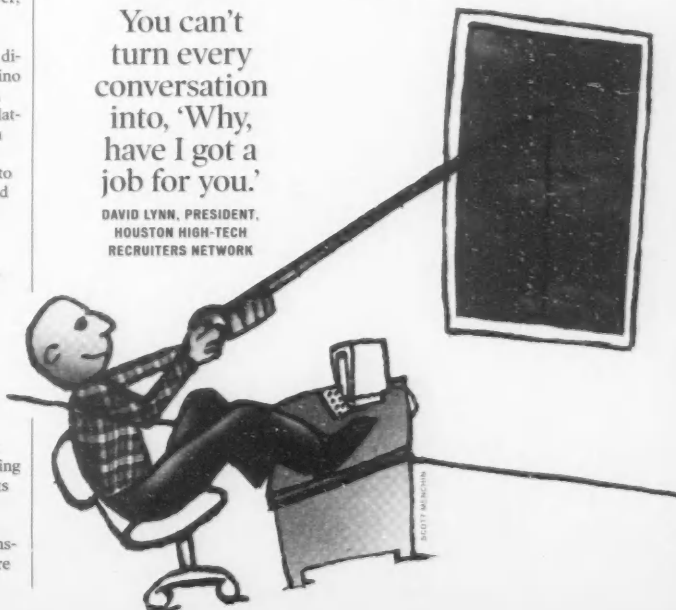
■ **Constant Networking: Preach to the Choir.** You never know where the next good Java developer will turn up, so network, network, network.

Don't go at it Hollywood-agent style, but "any IT recruiter worth his salt always has business cards," at church, at Little League games or on airplanes, says David Lynn, an independent IT recruiter and president of the Houston High-Tech Recruiters Network. "You can't turn every conversation into, 'Why, have I got a job for you,'" Lynn adds. "You have to be very selective about how you do it, and that's just part of the art of recruiting." ■

Goff is a freelance writer in New York.

“
You can't turn every conversation into, 'Why, have I got a job for you.'

DAVID LYNN, PRESIDENT,
HOUSTON HIGH-TECH
RECRUITERS NETWORK



SPEED. IT AIN'T WHAT IT USED TO BE. Used to be, you saved an end user a few minutes, you'd done good. Then along came the Internet, and you began saving people hours, even days. Better still, you were saving time that belonged to actual money-wielding customers, not just internal users, and — let's face it — customer time is more valuable than employee time when you're In Search of Excellence. You sold a book, or showed somebody their reservation, or shot them a white paper, and you were a hero.

But that low-hanging fruit is long gone. Your competitors are informing and transacting just as quickly as you are.

And customers want more. In business, speed itself has morphed. No longer a straightforward matter for stopwatches, it's now a complex set of interdependencies involving perception, convenience, competition, margins, customer data and security.

For information technology shops, it's a chess game played in three dimensions. At least. It's a given that you need lightning-fast, overload-proof systems to handle Web information requests and transactions.

Today's hurdle is to tie those customer-facing Internet systems to your back-end processes so that, for instance, production possesses pinpoint information about consumers' demands. Tomorrow's hurdle is the logical extension: letting consumers not only describe what they want, but also launch its actual production from their browser.

Analysts agree that the integration needed to take

this final, loop-closing step is not staggering. It's the required change in thinking that may separate winners from losers. To succeed, your business must recognize and cater to the consumer's newfound power.

'Mom Geek'

Sue Pyne worked at IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y., designed robotic controllers and managed a systems integration testing department at Tellabs Operations Inc. in Lisle, Ill. She left IT five years ago and now lives in Southboro, Mass., with her husband, Jerry, and her kids, 4-year-old Katie and 2-year-old Eddie. "I used to be a software geek," Pyne says. "Now I'm a mom geek."

Full-time mom geek is a very busy occupation. Pyne buys a lot of stuff online: "Drugstore.com, L. L. Bean, Lands' End, eToys."

Pyne loves ShopLink.com Inc., a Westwood, Mass.-based online grocery-buying service. She estimates an old-fashioned run to the nearest supermarket, kids in tow, took an hour and 40 minutes. ShopLink "takes 10 minutes online," she says, because she put in the time up front to create a template, called a master list, of the groceries she buys most frequently.

What's interesting, though, is that try as she might, Pyne finds it nearly impossible to talk about time-savings alone. Not long ago, eliminating a 100-minute, generally detested task (ever herd two little kids through a supermarket?) was your headline. Now it's just part of the online grocery-shopping picture, which also involves convenience, additional services, quality and ease of returns.

Armed with her Gateway PC, Pyne has newfound power. She's not afraid to use it. Or to ask for more.

The Schnozz Uprising

"People want speed and convenience; they want things their way," says Douglas F. Aldrich, managing director at Chicago-based A. T. Kearney Inc. and author of *Mastering the Digital Marketplace: Practical Strategies for Competitiveness in the New Economy* (John Wiley & Sons Inc., New York; 321 pages, \$29.95). "They say, 'I want what I want, right now.' It's a new power base for consumers."

Aldrich has little sympathy for organizations that don't get it. "Buying a car from a dealer ranks near root canal on consumers' wish lists," he says. "Well, the poor schnozz who needs a new car now has choices. Toyota has come out with the Dell model — build to order — and there's panic in Detroit."

He refers to Toyota Motor Corp.'s announcement that it plans to manufacture a vehicle five days after receiving the order. But "panic?" Try "imitation."

Take Ford Motor Co. In September, the Dearborn, Mich., automaker announced it will use Microsoft Corp.'s CarPoint Web site to create a build-to-order car-buying service.

Here's how it works. Consumers can use the Web to spec out their dream Ford, according to Jeff Liedel, chief technology officer at Ford's E-consumer division. On the back end, Ford uses a configuration engine from Austin, Texas-based Trilogi Software Inc. that knows all the company's option codes. So when Joe Prospect clicks his interest in a Mustang GT Coupe in the sunburst gold clearcoat metallic with

E-CUSTOMERS SAY: Speed is not Enough

the five-speed transmission and medium graphite cloth interior, those clicks are translated into characters that the company's production systems can read. Ford then locates the car you need (on a dealer lot or in transit) or creates a build order. The consumer gets immediate feedback on availability and delivery.

But note, poor schnozzes, that Ford delivers your car not to your driveway, but to your local dealer. Why keep dealerships in the equation when direct delivery would be quicker? Raw speed takes a backseat here.

Automakers are walking on eggshells to avoid ticking off their powerful dealer networks. That's got to be a factor (although Ford doesn't say so). Also, there's dealer prep — someone needs to inspect the vehicle. Moreover, putting consumer and dealer together sets up the service relationship. The goal, says Thor Ibsen, vice president of Ford's Consumer Connect program, is "to make it seamless to the consumer; it doesn't matter who delivers the service."

"We've had 150 years of the Industrial Age, in which the lens has been focused from the manufacturer out," Aldrich says. "The lens has now shifted. It goes from the consumer back into the distribution channel."

Ibsen says becoming faster and more responsive by transforming Web-gathered information into factory-floor action is "the next big race for automakers." And for business in general, it's safe to add.

Portal Power

A while back, Sue Pyne needed to rent a car. She favors Avis Inc. and Alamo Rent A Car Inc. To compare rates, she had to enter information at both Web sites, writing down data and double-checking to make

sure she was getting an apples-to-apples comparison.

Pyne is thrilled to hear about E-Services, from Hewlett-Packard Co. HP says an E-Service is "an asset made available by the Internet," the idea being to add a sales channel for services. Using E-Services, Pyne could go to a car-rental portal, exclude all companies but Avis and Alamo, key in her needs (including the fact that time was of the essence) and wait for the companies to contact her, each knowing that the others were bidding for her business.

E-Services and programs like it stand to create enormous portals for any topic — from enterprise application integration to cuticle care — and make it imperative that any serious player in that market pile in.

"If I'm going to use the Web today to make a travel reservation, I have to go to five or six different sites," says Roberto Modrano, general manager of HP's E-Services Division. "If I'm going to be four hours late, I need to contact every one of them. With E-Speak [the core technology — the language E-Services use to communicate with one another], I'll call my mediation broker. It knows my entire schedule. I'll tell this broker I'm going to be four hours late. It will contact all those other sites."

If E-Services catch on the way many analysts think they will, here's the resulting dilemma for business: Joining these uber-portals will be an absolute prerequisite for competitiveness — otherwise, you'll fall right off consumers' radar screens — but signing on means you'll always be competing in a reverse auction, sending out quotes to potential customers knowing full well that your competitors are doing the same.

E-Services has the potential to continue (and speed



The lens has now shifted. It goes from the consumer back into the distribution channel.

DOUGLAS F. ALDRICH, MANAGING DIRECTOR,
A. T. KEARNEY

up) the process begun by the Net: commoditizing goods and services alike. This creates an opportunity: You could — and should — be the first person in your organization to see the oncoming commodity steamroller. If you sell widgets and a widget portal begins to gather steam, with low bids snagging business, company officers need to know. Do you want to stay in a market in which you can make only a penny a unit? Or do you want to make a strategic move upmarket?

Looking Into Tomorrow

To see what the future may look like, check out www.ebiz.com.

Delphi Information Systems did just fine for 23 years as a vendor of insurance agency management software — 40% of all insurance premiums in the U.S. flow through its systems, according to Robin Raina, president and CEO of the Atlanta-based company.

But Delphi is no more. Though the company will continue to sell software, it recently changed its name to Ebix.com Inc. and refocused as an insurance portal. There are competitors, which Raina calls "quote engines," but they all steer consumers to an agent: Ebix.com can handle an entire transaction. A shopper keys in a quote request, and more than 150 companies are registered to slug it out for his business.

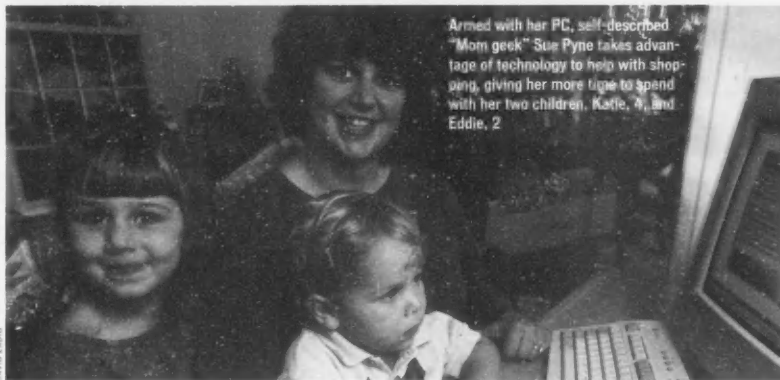
The idea for insurers is to get the consumer the best price before a competitor does. But here again, speed is complicated. Companies must evaluate the request, decide whether they want this consumer's business (is he a high risk?), perhaps advise him to modify the request (for instance, he might choose a higher deductible to get a better rate) and respond. Fast.

What Next?

The question then is, What do you do? How do you become, or remain, a player in a rapid-fire, hypercapitalist, consumer-driven world?

Top priority: Recognize what's going on in your market and make sure top executives know, too — whether they like the news or not. Accept the inevitable arrival of the commodity steamroller and install systems that will let your business thrive when it arrives. That means linking customer-facing technology not just to databases, but all the way through to production systems (securely and reliably, of course). The ultimate goal: production runs of one unit, launched in real time, by the customer.

That's just dandy as far as Sue Pyne is concerned. She wants this consumer Valhalla and wants it fast. "I have to get off the phone; my doorbell's ringing," she says. "Hey, it's UPS!"



igh

Technology has brought unprecedented power to the consumer. Now, you must offer a rich blend of speed, convenience and service. How can IT tackle this challenge?
By Steve Ulfelder

Every company is different.

Every e-solution is different.

But pretty soon, you'll be able
to lump just about every organization
into one of two groups:

those who are maxing-out
the return on their e-investment...



Start
here.

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...and those who aren't.



THE MANAGEMENT mantra "delegate, delegate, delegate!" can be an invaluable guide. But relying too heavily on this credo when overseeing information technology managers in charge of vendor contracts can be hazardous to an organization's health.

So say several CIOs, who agree that getting the best possible deals and service levels from third parties — and even keeping contract managers honest — requires a team approach with active CIO participation. Whether they're engaged in outsourcing megadeals or simply holding product vendors to their maintenance promises, IT executives advocate minimizing the authority of any individual contract manager.

"As a CIO, you can't just pick your staff and walk away," says Terry Childress, systems manager and CIO at the Mississippi Division of Medicaid in Jackson, Miss. The state government agency spent \$23 million last year on outsourcing its medical claims processing to Electronic Data Systems Corp. Childress and his staff collectively issued the requests for proposals and jointly specified the service levels expected from Plano, Texas-based EDS.

Childress describes his staff as technology "auditors" — individuals whose job it is to find flaws, then work with both Childress and EDS to fix them. "If for some reason EDS is not performing in accordance with its contract — such as resolving a claim problem or identifying a fix within 24 hours — it's up to the contract managers to determine that," he says. "But then I step in and recommend a plan of action."

At New York-based J.P. Morgan & Co., diverse reporting chains offer checks and balances. For example, there is a financial group that reports to a technology controller — as opposed to Tom Hynd, the managing director in charge of the company's worldwide outsourcing contract with a group of service providers led by El Segundo, Calif.-based Computer Sciences Corp. (CSC). The deal includes services from Chicago-based Andersen Consulting, AT&T Solutions and Bell Atlantic Network Integration.

"The financial group is part of my virtual, extended team. But having them report to a different manager puts a balance of control into place," Hynd acknowledges.

The group management effort is also in place on a large scale at Du Pont Co. Before signing a \$3 billion outsourcing deal with Andersen Consulting and CSC nearly three years ago, Du Pont Information Systems in Wilmington, Del., formed an alliance-management group composed of managers in Du Pont sites around the world.

"At Du Pont, large vendor decisions are rarely, if ever, the sole responsibility of a single individual," says CIO Bob

KEEPING CONTRACT MANAGERS HONEST

There are risks in delegating management of IT outsourcers and vendors, but CIOs say a system of checks and balances can go a long way By Joanie Wexler

Ridout. "We also rotate people in the business units to IT and back again, so people are performing a blend of roles within the organization."

Ducking the Boomerang

The 28-person IT staff at Federal Home Loan Bank of Dallas in Irving, Texas, also shares contract management for application software support and training. Each staff member is assigned full responsibility for a technology area, such as security, which includes vendor management within that area.

This structure provides a built-in incentive for contract managers to perform well. "If help desk calls accelerate, the contract manager is the one who will be working around the clock to fix the problems," says Nancy B. Parker, senior vice president and CIO.

The volume of help desk calls is a reflection of customer satisfaction and a common gauge of how well a contract manager is doing his or her job.

Hynd calls this the "noise" factor, which, at J.P. Morgan, also includes informal hallway comments about user

satisfaction. The noise factor is one, subjective measurement that Hynd's boss, the investment banking firm's CIO, uses to measure his performance, Hynd says.

One quantitative measurement is how quickly billing issues are resolved. "There are huge amounts of money passing hands in this deal, and we can't afford to have billing disagreements in limbo," Hynd notes. He says the corporate goal is to have such issues resolved within 90 days, adding that he is judged on the company's success in meeting that goal.

Establishing, Enforcing Service Metrics

A common practice is to require regular reports of the vendor's performance from contract managers. "This prevents problems from mushrooming into huge roadblocks," says Cynthia Murphy Doyle, an analyst at International Data Corp. in Framingham, Mass.

Childress, for example, expects monthly reports from contract management staff but notes that a perfect report is a red flag, because it isn't realistic. "I actually want the staff to identify trouble areas," he says.

And what about deterring contract managers from remaining cozy with a particular vendor for reasons of personal gain? Companies like Du Pont have formal policies in place.

According to Ridout, there is a monetary ceiling on the value of any gift that can be accepted from a vendor. "You can accept a coffee mug with the vendor's logo on it, but you can't take your spouse to Paris on the vendor's tab." ■

Wexler is a freelance writer in Campbell, Calif. Contact her at joanie@jwexler.com.



Large vendor decisions are rarely, if ever, the sole responsibility of a single individual.

BOB RIDOUT, CIO,
DU PONT CO.

Making the Most Of Contract Managers

Want to ensure that your contract managers are doing their jobs right? Here's some advice from IT executives for their troops:

- Diversify. Having sign-off authority and checks and balances in your reporting structure can prevent personal agendas and minimize poor decision-making.
- Track the "noise" factor — the volume of help desk calls and informal complaints about IT service levels.
- Require regular reports from contract managers on vendor performance. Nip declining service levels in the bud.
- Reward contract managers for being proactive in troubleshooting.
- Limit the acceptance of gifts or bonuses.
- Require staff to document potential conflicts of interests, including a family member working for a selected vendor company.

— Joanie Wexler

So how do you take advantage
of all the opportunity out there?

Step one: develop an enterprise business strategy.
(EDS can help with that.)

Step two: select & implement the right
technologies to make your strategy work.
(EDS can help with that, too.)

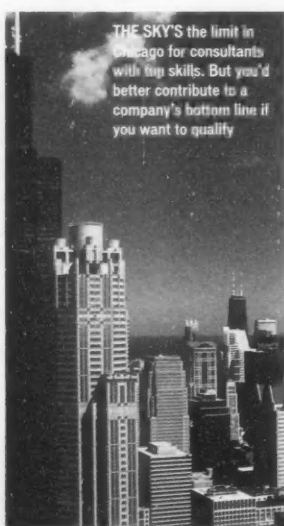
Step three: adulation, applause, credit, etc.
(You're on your own with this one.)



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HOT SPOTS

Skills for the right niche and the right location can still get a consultant top dollar, even as many companies are cutting down on contract labor By Deborah Radcliff



THE SKY'S the limit in Chicago for consultants with top skills. But you'd better contribute to a company's bottom line if you want to qualify

BECTON, DICKINSON and Co., a \$3.1 billion global health services and products company in Franklin Lakes, N.J., is looking for a few good consultants to help with its SAP rollout.

But human resources director Nate Bellemay would rather hire permanent staff to do the job. "Some of these consultants can cost up to half a million a year," Bellemay says. "Frankly, we can hire them for a lot less."

Bellemay's not alone. According to a recent *Computerworld* hiring survey, hiring managers hope to rely less on contractors and more on employees to fill their technology needs in the coming year.

And there's bad news as well for consultants. Some businesses are insisting that in-house staff, not consultants, lead their information technology projects.

"We don't tend to use consultants for overall project management. We like to keep a balance, staffing steady-state work with in-house employees and

using consultants for peak activities or for very old technologies we don't want to continue our staff on," explains John Bent, director of corporate information systems at Amgen Inc., a \$2.7 billion biotechnology company in Thousand Oaks, Calif.

Sound like gloomy market forecasts? Not to worry. There's still plenty of work for consultants who are mobile enough to follow the work and know how to position themselves in the right niche, says Melinda Oliver, vice president of business development at Glendale, Calif.-based IT staffing firm Software Management Consultants Inc. (www.smc.com).

Hot growth areas such as Southern California, Chicago, Houston, Phoenix and Atlanta are still rich mining fields for technology consultants. But like Amgen, most employers are looking for business and industry knowledge and for very specialized skills in enterprise resource planning (ERP), back-office integration, databases and Web development projects, say hiring man-

agers and job placement professionals.

Southern California is one area in which there's still strong demand for consultants. According to Oliver, the entertainment and banking industries in and around Los Angeles are expanding their e-commerce efforts. And as long as demand for Web developers outstrips supply, consultants can bank on lucrative work in the area.

Specifically, entertainment industries are looking for consultants to help build video- and audio-capable Web applications. And financial companies are stampeding into online banking and transactional business, while also integrating mostly PeopleSoft Inc. ERP suites, according to Oliver.

"Consultants stay consistently busy in our area. Entertainment companies are looking for Web, Oracle, SQL and other database developers," Oliver says. "With all the mergers in the financial services industry, Web, e-commerce, data warehousing, data modelers and client/server application developers

Hot Spots, page 80

Getting the most out of
your e-investment is more than
a "technology" story.

It's also a "better margins" story,
an "improved quality" story and a
"speed to market" story.

(On Wall Street, this is known
as a "love" story.)



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HOTSPOTS



Continued from page 78
are also still strong [positions] around here."

Oliver says she even gets calls from as far north as Seattle for such experience. "Actually, the entire West Coast is still in pretty strong need of C++ and Visual Basic programming consultants — the same thing companies are looking for down here," she says.

In fact, businesses are having trouble finding skilled consultants to fit the bill in both e-commerce and ERP integration, Oliver says.

Jesse Cochran couldn't agree more. As an IT project leader and owner of a consulting firm 10 miles southeast of Oliver's Glendale office, Cochran says he and his team spend many a day cleaning up the work of other consultants. The biggest problems he runs into are that consultants who have gone before him don't plan their applications for the future and neglect to update and integrate back-office operations to facilitate Web-based transactions.

So Cochran capitalized on those problems and built a niche for himself. His company, FutureWare Software Consulting Group, specializes in Web-

to-back-office development and integration. That, he says, calls for a combination of highly specialized skills in database implementation, Visual Basic Script, the Internet programming language HTML, Common Gateway Interface and "a little bit of Java."

Cochran has also found a niche for his 10-person consulting firm in a relatively untouched vertical market: mom-and-pop retail shops such as scuba stores and art galleries.

"My clients are starving for e-commerce. Everyone wants to sell on the Web and take orders and payment over the Web," Cochran says. "Once you have the Web-based product, you've got to have the back office to support the clientele. But one of the issues we're finding with a lot of our newer clients is they have older back-office systems."

Way Down South

Because of its high concentration of telecommunications companies, Atlanta is also a mecca for technology consultants, according to Ed Grasing, manager of technical recruiting at New York-based job placement firm Pencom Systems Inc. (www.pencom.com).

"Just about every player in telecommunications, whether wireless or hard-line, is down here," Grasing says. "You also have a lot of interesting start-ups down this way like MindSpring Communications Inc. and [Internet Security Systems Group Inc.]."

But when compared with more

senior techie areas such as New York, Boston and Silicon Valley, Atlanta's corporate base is about a year behind in terms of e-commerce efforts, he says. That also spells jobs for skilled Java engineering consultants (the types that earn \$75 to \$100 per hour).

"There are a lot of Java jobs here, but not a lot of talent. Employers are seeking senior-level talent with five to seven years of object-oriented background and at least one year of Java," explains Grasing, who in the past 18 months has placed 50 to 60 such specialists in the Atlanta area.

Grasing acknowledges that IT consultants working in Atlanta don't pull in as much money as their tech-city counterparts, but he says it balances out because the cost of living is so low in Georgia. He warns, though, that transplants to outlying suburbs and townships around Atlanta will face locals who are "very cautious around newcomers."

Windy City

According to Grasing, Chicago is undergoing a similar drive to get up to speed technologically.

Ari Kaplan, an independent Oracle consultant, moved to Chicago in 1995 and has been busy ever since. In many ways, he says, Chicago is on the leading edge of technology work. Companies such as Motorola Inc., Andersen Consulting and Jellyvision Software

Hot Spots, page 82

My clients are starving for e-commerce. . . . Once you have the Web-based product, you've got to have the back office to support the clientele.

JESSE COCHRAN, IT PROJECT LEADER,
FUTUREWARE SOFTWARE CONSULTING

Salaries for IT Consultants

Paychecks for consultants continue to grow at a healthy pace — especially at the top levels:

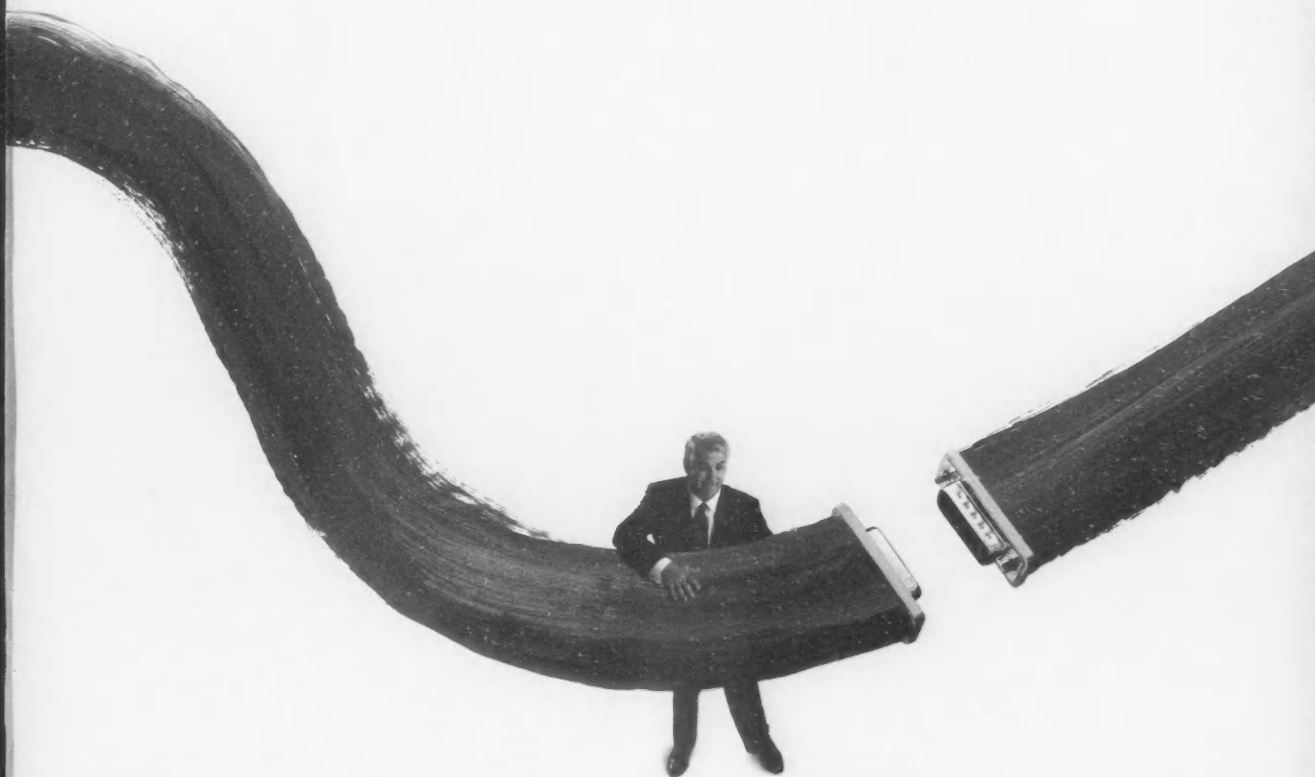
JOB TITLE & DESCRIPTION	EXPERIENCE*	SALARY	BONUS	TOTAL
Research associate Supports the activity of entry-level and management consultants.	Low level	\$32,000	\$3,400	\$35,400
	Midlevel	\$43,000	\$5,000	\$48,000
	High level	\$59,000	\$13,400	\$72,400
IT or systems consultant Has little or no project management experience. Has developed process/systems analysis and implementation skills.	Low level	\$35,000	\$4,000	\$39,000
	Midlevel	\$40,000	\$5,000	\$45,000
	High level	\$59,100	\$25,200	\$84,300
Management consultant Has some project management experience. Doesn't manage others. Is responsible for process/systems analysis and implementation for a portion of a project.	Low level	\$65,000	\$7,000	\$72,000
	Midlevel	\$80,000	\$10,000	\$90,000
	High level	\$106,500	\$30,000	\$136,500
Senior-level consultant Responsible for overall project management, including deliverables and schedule.	Low level	\$70,400	\$8,000	\$78,400
	Midlevel	\$85,000	\$12,400	\$97,400
	High level	\$120,000	\$40,000	\$160,000
Junior partner Manages other consultants, resells the services of the consultancy and manages client portfolios.	Low level	\$88,000	\$10,000	\$98,000
	Midlevel	\$116,000	\$25,000	\$141,000
	High level	\$150,000	\$58,000	\$208,000
Senior partner Top executive for a consulting organization. Manages and markets the services of the consultancy.	Low level	\$100,500	\$20,000	\$120,500
	Midlevel	\$150,000	\$42,000	\$192,000
	High level	\$260,000	\$100,000	\$360,000

* Low level = one to two years of IT experience. Midlevel = three to four years of IT experience. High level = five or more years of IT experience.

SOURCE: COMPUTERWORLD'S 1999 ANNUAL CONSULTANTS SALARY SURVEY, MAY 1999. SURVEY OF 250 IT CONSULTING COMPANIES, WITH AN AVERAGE OF 101 IT CONSULTANTS EMPLOYED PER COMPANY.

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Internet systems. That's one option.

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synchronous, Web-enabled system.

With option two, EDS can help you
discover some incredible opportunities
for your existing systems.

The first option?
That's the sort of thing that causes
CFOs to become trout farmers.

HOTSPOTS

Continued from page 80
have a strong presence there.

Kaplan also says large companies such as McDonald's Corp., petrochemical giant BP Amoco Inc. and Sears, Roebuck and Co. are in the midst of large-scale e-commerce and data warehousing projects, all of which call for a quick skill base in those areas.

"I have Chicago's *Silicon Prairie* magazine in front of me," Kaplan says. "I would say that much of the opportunities are for Oracle [database administration] and development, Unix administration and Web design."

Kaplan has also made a consulting niche for himself. And it doesn't have so much to do with geography as it does with business topography. That is, he strikes out for industries that aren't traditionally technical. As such, he's

developed databases and decision-support systems for just about every Major League Baseball team in the country.

Until Kaplan got into the act, talent scouts tracked players on written notes that they later stuffed into file drawers.

"If a team wanted to trade a player or recruit a new one, it would take weeks, maybe months, to get this information up to the team president," Kaplan says.

Kaplan has put some polish on his niche by making user-friendly interfaces that look like the forms scouts already use and then training those scouts to use the new system. Some, he says, are so technophobic that they arrive for their computer training with chewing tobacco (and buckets) to calm their nerves.

Now Kaplan's setting up similar databases for dance, theater and ticketing

agencies. "So many organizations are behind the curve electronically," he says. "They need database decision-support for everything from ticket forecasting to booking their performances."

Hot Skills

Cities such as Houston and Phoenix offer great opportunities for consultants because these places are experiencing an influx in telecommunications, financial and technology companies, according to Margi Fatcheric, founding president of Relational Options Inc., a Florin, N.J., job placement firm.

In addition, traditional high-tech meccas such as Silicon Valley and the Boston area are still high-volume locations for consultants with cutting-edge skills, especially in the areas of Internet and e-commerce development and SAP. Universally, Fatcheric says, "the Internet is a sweet spot right now and probably will be over the next five-plus years. That requires talent in the areas of Java, C++, object-oriented tools, Windows and Unix."

Also, SAP skills are hot everywhere, she adds, and they require more than technical skills; they require "functional talent" — experts in manufacturing, human resources, accounting and so on.

In addition to the telecommunications, entertainment and financial industries, big accounting firms and pharmaceutical companies throughout the country are looking for people with those skills, Fatcheric says.

In fact, the entire medical and biotechnology industry is under the gun to conform to a Food and Drug Administration order to establish secure electronic documentation and auditing, Bent says. The order will increase the need for information security skills, which Fatcheric predicts will soon catch up with the demand for Web-development skills.

Because of that, Bent says he will be looking for consultants with specific skill sets in system auditing, documentation, security advice and security-system implementation. He's just waiting for year 2000 work to die down first.

But Bent is quick to point out that he's looking for skills to do only the coding and integration work, not project management, which he plans to leave to in-house employees.

Thus, staying on top of this changing marketplace requires insight and tenacity. Professionals and hiring managers offer this last bit of advice to those who want to stay ahead in this declining market: keep your skills sharp, follow the work and build a portfolio of references. And the best way to gain strong references, Cochran says, is to "design projects for next year instead of tomorrow."

Radcliff is a freelance writer in Santa Rosa, Calif.



I would say that much of the opportunities [in Chicago] are for Oracle [database administration] and development, Unix administration and Web design.

ARI KAPLAN,
INDEPENDENT ORACLE CONSULTANT

Top Regions for Consulting Skills

Here's a rundown of opportunities, by region, for consultants with the right skills:

IT SKILLS CATEGORY	BEST REGIONS FOR HIRING
Internet	New England, Mid-Atlantic
Language	New England, Mid-Atlantic
Development tools	New England, Mid-Atlantic, South Atlantic
Database	New England, Mid-Atlantic, East North Central
Operating systems	New England, South Atlantic, East South Central
LAN	New England, East South Central, Pacific
Client/server applications	West South Central, South Atlantic, Mid-Atlantic
Systems software and support	New England, Mid-Atlantic, South Atlantic, West South Central

*REGIONS ARE AS FOLLOWS: NEW ENGLAND - MAINE, VERMONT, NEW HAMPSHIRE, MASSACHUSETTS, CONNECTICUT, RHODE ISLAND, MID-ATLANTIC - NEW YORK, NEW JERSEY, PENNSYLVANIA, SOUTH ATLANTIC - DELAWARE, DISTRICT OF COLUMBIA, MARYLAND, VIRGINIA, WEST VIRGINIA, NORTH CAROLINA, SOUTH CAROLINA, GEORGIA, FLORIDA, PUERTO RICO, U.S. VIRGIN ISLANDS, EAST NORTH CENTRAL - WISCONSIN, MICHIGAN, ILLINOIS, INDIANA, OHIO, EAST SOUTH CENTRAL - KENTUCKY, TENNESSEE, MISSISSIPPI, ALABAMA, WEST NORTH CENTRAL - NORTH DAKOTA, SOUTH DAKOTA, MINNESOTA, WISCONSIN, IOWA, KANSAS, MISSOURI, WEST SOUTH CENTRAL - OKLAHOMA, ARKANSAS, LOUISIANA, TEXAS, MOUNTAIN - IDAHO, MONTANA, WYOMING, NEVADA, UTAH, COLORADO, ARIZONA, NEW MEXICO, PACIFIC - ALASKA, WASHINGTON, OREGON, CALIFORNIA, HAWAII, GUAM.

SOURCE: COMPUTERWORLD'S ANNUAL SKILLS SURVEY. SEE RELATED STORY ON PAGE 84.

With all the mergers in the financial services industry, Web, e-commerce, data warehousing, data modelers and client/server application developers are also still strong [positions] around here.

MELINDA OLIVER,
VICE PRESIDENT OF BUSINESS DEVELOPMENT, SOFTWARE MANAGEMENT CONSULTANTS



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complex.

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your customers.

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Resources For IT Consultants

BY MARI KEEFE

As a consultant in information technology, you know your workday doesn't end with the project and the company you've signed on with. No, you really are the uber-employee: your own chief technology and chief financial officer, and your own human resources and public relations director.

Fortunately, the Internet makes wearing all those hats a little easier, with places to go for the lowdown on employment, networking and more.

Internet Resources

Check out the following sites for help in your career development and workload management:

Realrates.com

www.realrates.com

Start here. The site was created by Janet Ruhl, author of several books about computer consulting, including *The Computer Consultant's Guide* and *The Computer Consultant's Workbook*. Features include an ongoing billing rate survey, plus a busy message board where you can post questions, concerns and advice on topics such as working in various regions, contractual and tax obligations, hiring foreign workers and rates. There's also an employment section and a section called "Tips and Gotchas."

Contract Employment Daily

www.cedaily.com/menu.html

This collection of bulletin boards differs from the other sites listed. It runs the gamut from tax and legal issues, industry news and horror stories to an open forum that breaks down into "contractor lounges," depending on what kind of consultant or contractor you are. Some forums are more active and current than others. Consultants and contractors can also check current rates.

The Contract Employee's Handbook

www.cehandbook.com

Information on getting started, legal issues, finances, job searching and more. A newsletter for contract employees is available via e-mail.

CPUiverse

www.cpuiverse.com

A resource from *Contract Professional* magazine, this site provides access to feature articles as well as training, tax law, technology, business and insurance resources for the contract professional.

The Consultants' Services Page

www.ieeeusa.org/business/aicn/menu.html

From the Institute of Electrical and Electronics Engineers, this page supports the career interests of self-employed members in the U.S. The site links to local IEEE consultant networks, publications and articles.

Contracting and Consulting

www.computerworld.com/res/careers/cont_index.html

The online index of *Computerworld's* IT Careers section articles on contracting and consulting provides links to the 1998 and 1999 Consultant Salary Surveys and articles on topics such as contractor classification, tax regulations and using "bench time" wisely.

ConsultingCentral

www.consultingcentral.com

A Kennedy Information LLC online publication that features articles from the previous month's issue. Contractors can also find industry news and other resources here.

Organizations

Try the following sites to network and get help, information or services:

Software Contractors' Guild

www.scguild.com

This is a worldwide organization of software contractors and consultants. Members can post résumés and links to Web pages on the site, and businesses can seek members' services by searching by type of contractor and skill, name or other keywords. There's also an extensive list of contractor organizations.

The Independent Computer Consultants Association

www.icca.org

This is a national nonprofit organization that provides professional development opportunities and support programs for independent computer consultants. The site also has a find-a-consultant feature, which lets you search for members and get Web page or e-mail addresses.

Professional and Technical Consultants Association

www.patca.org

A nonprofit association that promotes the professional interests of independent consultants. Services offered include consultant directories, referrals, training, mentoring, insurance discounts, a newsletter and pertinent legislative information and advocacy.

National Association of Computer Consultant Businesses

www.nacccb.org

This group represents the recruiting agencies that specialize in providing temporary consultants. Consultants can check out trends and legislative issues in the industry and find recruiting companies and computer consulting jobs.

Finding Your Next Gig

There are myriad employment sites on the Web. The following are devoted to contract employment:

Contract-jobs

www.contract-jobs.com

You can announce your availability and search for employment by location and keyword.

ComputerWork.com

www.computerwork.com

IT consultants and contractors can submit their résumés to this site, which claims to have more than 10,000 computer jobs listed at any time, and its Automatch feature will e-mail back matching gigs. You can search for employment by location, skills keyword or job title. In addition, there's a set of resources covering training, tech news and career information.

Contract Employment Weekly

www.ceweekly.wa.com

Jobs for engineering, IT and other technical personnel seeking contract work. Most services are for members only, but for \$35, you can search the job database, add your résumé and get a directory of contract employers and an e-mail alert service.

DICE

www.dice.com

The Data-Processing Independent Consultants Exchange (DICE) is supported by recruiting agency ads and boasts 12,000 job listings. It has free résumé posting, e-mail services and job searches by location, terms of employment and job type.

ConsultLink

www.consultlink.com

This directory site matches consultants and clients. Consultants can set up a free ConsultLink Profile to list special skills. Companies can then peruse the profiles.

Independent Contractor Exchange

<http://icenationwide.com>

This serves as a contractor directory. Contractors file profiles, and the exchange e-mails them if a match is found. It also serves as an "employer of record" and offers insurance packages.

misc.jobs.contract

This newsgroup lists contract employment opportunities. You can also search sites such as www.deja.com to find Usenet groups posting jobs in specific regions.

The Home Office

Check out the following sites devoted to helping you run a small business:

U.S. Small Business Administration

www.sbaonline.sba.gov

Financial, technical and management assistance to help you start, run and grow your business.

National Association for the Self-Employed

www.nase.org

Here, you'll find information on legislation and taxation issues that affect the self-employed and articles from the group's publication *Self-Employed America*.

Ohhhh, the Taxman

Confused about tax regulations for consultants? Start with the following sites to help answer your questions and end your confusion:

Tax Regulations in Plain English

www.irs.ustreas.gov/plain/tax_regs/index.html

This Internal Revenue Service site is a good place to start your search. It offers information about regulations and lists other helpful links.

The Computer Software Industry Association

www.softwareindustry.org/csia

Here, you can find information on the reclassification of independent contractors. It includes a guide to legislative, regulatory and policy issues affecting the software industry.

Tax Tips

www.averygroup.com/consultants/resources/taxtips/default.htm

This site offers brief tips on proving your tax status, IRS criteria to determine it and what to do when the IRS decides you're a W-2 employee.

Some Friendly Advice

Here are some places you can get help or answers from your peers:

Help-site.com

www.help-site.com

This site provides a directory of links to manuals, documentation, tutorials and other support pages, with links to 1,022 documents and 233 sites.

The User Group Connection

www.ugconnection.com

Acts as a registry for user groups and maintains a searchable database containing nearly 4,000 entries.

Computerworld's QuickStudies

www.computerworld.com/res/quickstudy.html

This offers weekly tutorials about computer-related trends, technologies and business terms. ■

Keefe is Computerworld's editorial research specialist.



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products, faster.

They'll improve customer service.

Heck, they may even get to know
each other's names.

Balance Sheet

BY JACQUELINE EMIGH

A **BALANCE SHEET** is one element of a company's financial statement, along with the statements of income, cash flow and shareholders' or owners' equity. Sometimes described as a "financial snapshot," the balance sheet is extremely fluid. Every time a company writes a purchase order or takes in cash, the balance sheet changes.

But the balance sheet's contents can be significant. "Your bankers and vendors want to know whether they should extend you more credit. Your shareholders want to know whether you're squandering their resources," says Michael McLean, a certified public accountant in Oregon.

Frequent Updates

Balance sheets are also used to help a company continually monitor its financial status. As a result, the sheets are generally prepared quite frequently — daily or every 10 or 30 days, according to McLean.

Publicly held companies release balance sheets and other financial results to shareholders quarterly. But balance sheets are important to information technology departments, too.

"IT people need to understand how the decisions they make — such as build vs. buy or purchase vs. lease — impact the overall business strategy of the company. Being able to read the balance sheet is part of that," says Jack Wilson, a professor of physics, engineering science and IT at Rensselaer Polytechnic Institute in Troy, N.Y.

"This is especially true in start-ups, where everybody has to know about everything," Wilson adds.

"It's becoming an increasingly significant challenge for IT folks — whether they're in mainframes or networks or whatever — to comprehend the financial impact of their decisions for the current year, as well as for future years,"

Contents of the Balance Sheet

DEFINITION

The balance sheet is a snapshot of a company's assets, liabilities and owners' equity, or ownership interest. The math behind the balance sheet can be written as: **assets = liabilities + owners' equity**. IT professionals need to know about the balance sheet to help support the accounting and finance departments, as well as to help make strategic IT decisions, such as buying equipment vs. leasing.

ASSETS = LIABILITIES + OWNERS' EQUITY

What a company owns, such as:

- Cash
- Marketable securities
- Buildings
- Equipment (including IT equipment)
- Inventories
- Accounts receivable (invoices yet to be paid)
- Intangible assets (such as trademarks, patents and goodwill)

What a company owes, such as:

- Accounts payable (bills yet to be paid)
- Loans and mortgages
- Leasing fees (on buildings and IT equipment, for example)
- Salaries, wages and commissions

Also known as "ownership interest." Refers to the value of investments in the firm against assets, after deducting liabilities. Examples of equity can include:

- Shareholders' equity (from common and preferred stock)
- Notes receivable from employee stock-ownership plans
- Retained earnings (cumulative earnings since company's inception, minus dividends and other adjustments)

adds Craig Cauthen, an IT financial manager at The Coca-Cola Co. in Atlanta.

Experts generally agree that when it comes to IT assets, the balance sheet of a dot-com company tends to look quite different from that of a traditional firm. By their very nature, dot-coms rely heavily on IT infrastructures. But unless a dot-com has well-established credit, it's likely to lease IT equipment, says John A. Tyler, a CPA in Cambridge, Mass.

Also, unless IT equipment

has been purchased under a lease-to-buy agreement, the leasing fees will appear as liabilities. In contrast, established companies that buy IT equipment can list it as an asset.

"Dot-coms are more virtual, in both time and space," Wilson notes. They also tend to be valued more on the basis of ideas and future earnings potential than on fixed assets like IT infrastructures. In terms of the dot-com's assets, the percentage of fixed assets tends to be low compared with the

percentage of intangible assets like patents and trademarks.

Some intangibles can't be included as assets because they can't be assigned a monetary value, says Victor Petri, a principal at PricewaterhouseCoopers in Boston.

As a rule, items like patents, trademarks and goodwill can be listed as intangible assets if they have been bought, says Carol Benintendi, a principal at Gold & Goldberg, an accounting firm in Newton, Mass. Experts point to other items, in-

cluding Web site addresses and phone numbers, that can be intangible assets if acquired.

Intellectual property such as internally developed software can be listed on the balance sheet — only upon completion of either a working model or a "detailed program design" to demonstrate that it really works, Benintendi says.

There is less agreement, though, on the relative importance of the balance sheet to dot-com companies in comparison with brick-and-mortar companies. Many dot-coms are privately held, so there's no need to show the numbers publicly, Benintendi notes.

Sign of Good Sense

Some experts say a solid balance sheet can also indicate that a company has good, sound business sense. "Start-ups need to do more than just come up with a brilliant idea. They also have to be able to manage and market that idea," Benintendi observes.

She says a key indicator of a good balance sheet is a strong "current ratio," which is determined by dividing current assets by current liabilities. "Liabilities are not necessarily bad, but they should be counterbalanced by assets in some way," she says.

For example, due to hefty amounts of marketable securities, cash on hand and intangible assets, Seattle-based Amazon.com Inc.'s current ratio last year was 2.6-to-1, even though fixed assets constituted just 4% of all its assets.

In comparison, Johnson & Johnson, the health care products giant based in New Brunswick, N.J., is rich in fixed assets but showed a current ratio last year of only 1.4-to-1. Experts say the current ratio should be higher than 1-to-1 but note that a ratio of 4-to-1 is too high because it indicates that the company is holding on to a large portion of resources that might be spent to grow the business. ■

Emigh is a freelance writer in Boston.



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real-time information around the world.

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idea stuff, design stuff, product info
stuff and, oh yeah, invoice settlement
stuff (aka "money stuff").



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Dear Career Adviser:

I have an MBA degree and work in the supply-chain area at a large company in the Midwest. Due to the high potential for IT careers, I plan to use my company's education program (\$5,000 per year) to build my knowledge and skill set in IT areas. As my experience in IT is limited,

should I pursue a master of computer science degree? What about online programs?
— MIDWEST MASTER'S

Dear Midwest:

Remember you're in the real-time/hit-the-ground-running world of IT that rewards hands-on technical skills more often than higher-level degrees. "Midwest might find it easier to break in as a software quality assurance tech, and then work his way into test engineering and then into development," says Garrett T. Browning, a recruiter at Autodesk Inc. in San Rafael, Calif.

Also, taking classes in infrastructure technology like Web/e-commerce, networks and SAP would certainly enhance your career in supply-chain management, Browning says. Or you might become proficient in Visual C++, Microsoft Foundation Class and Java if you want to be-

come a programmer.

If your company has an education budget, it probably also has preferred vendors and gives on-site and online courses. Some universities offer online accredited courses, and some will give credit for other online and employer on-site courses if the student can test out.

Dear Career Adviser:

I have about six years of work experience, four of them working for a company where I became the online commerce manager. This was a technical marketing role, where I was part of a team responsible for an e-commerce site geared to educating customers and selling product into a specific niche market. The site carried fewer than 100 stock-keeping units and represents a corporation with an already-established brand.

For less than six months, I've been working in more of

an operations role for a much larger portal site. I'd prefer being back in my old type of job, but as the top person, responsible for creating this larger e-commerce platform. I thought I was ready for the new role, but my interviews have left me wondering. — HEAD HONCHO

Dear Honcho:

It sounds as if you want to fast-track your career but reality is saying, "Come back when you already have this experience." Your experience is in creating a site with just a small set of products where customers visit and might buy something, but larger e-commerce sites handle thousands of products and transactions; develop complex, dynamically served pages tailored to a

customer's tastes and prior activity on the site on the fly; and focus on converting laid-back shoppers into hard-core customers. They also have to get huge amounts of data into, and reports out of, the database back end.

To assume that top role at a new company, you'd need to have been responsible for those functional areas before. Among other things, do you know what works and what doesn't at one of these larger sites? Have you been responsible for both success and failure at a major site that competes for e-dollars? Apparently not, as you were previously part of a team on a smaller site.

Instead of trying to become the top dog for a company's e-commerce site, a better move right now is to go after that role at your current company. Try making the move once you have more experience. Most major e-commerce sites and the new megamalls can't afford to hire someone who wants to "grow into" that role.

They must find talent that has already developed a standout Web site with great consumer "stickiness," never mind revenue.



FRAN QUITTEL is an expert in high-tech careers and recruitment. Send questions to her at www.computerworld.com/career_advisor.

Dear Career Adviser:

I am a senior systems engineer doing database presales support for a major relational database company. I have received two 20%-plus pay increases twice by changing jobs three times in the past four years. With a base salary of more than \$80,000 and an annual commission of \$28,000 to \$30,000, how likely is it that I can duplicate another 20% to 25% pay increase? To do so, where should I focus my efforts?

— MONEY TALKS

Dear Money:

I wonder if you're marketing yourself on the basis of money or if you have a sustainable competitive advantage as someone who makes a real contribution. Even in the current job market, companies have salary ceilings, so if you're seeking more pay for the same skills, you should go after a pure sales role or start managing and motivating people.

Alternatively, you might also sell yourself to a start-up where you set up the whole customer support function, become a contractor or take your skill set into a company that needs to turn its support function around.

In any event, try to go somewhere and stay there for a few years. That's what your résumé needs. ■

BRIEFS

NYSE on the Net

The New York Stock Exchange Inc. (NYSE) said it plans to create an Internet-based system that will let investors enter trades of less than 1,000 shares electronically, rather than through floor traders. CEO Richard Grasso said the NYSE plans to introduce the service within the next six months.

Online Shopping Spree

Internet shoppers spent \$200 million online during the last week of October, buying more software, music and toys than anything else. Results of the weekly survey, conduct-

ed by PC Data Online in Reston Va., also suggest that nearly 4% of all U.S. Internet users made an online purchase between Oct. 28 and Oct. 31, almost a month before the day after Thanksgiving, which marks the traditional first day of holiday shopping. The survey sampled 2,080 home-based Internet users.

Delta Outsourcing

Delta Air Lines Inc. in Atlanta has shifted payroll tax filing operations for its 75,000 employees in 48 states to outsourcer ProBusiness Services Inc. in Pleasanton, Calif. Delta, which had handled the process internally, said that with

the new service it will no longer need to manually produce the reports and tax payments required by the states in which its employees reside.

GOP Online

The Republican National Committee said it will offer online services to its members through an agreement with Internet service provider Big Planet Inc. in Provo, Utah. The service, to be called GOPNet.com, will include political news, GOP events and chat rooms. It's due to be launched in January.

Internet Think Tank

A group of Internet heavyweights has formed the Internet Policy Institute, an independent, nonpartisan

think tank that will provide research and data on the Internet and its role in society. The group is led by Jim Barksdale, former CEO of Netscape Communications Corp., and includes Vint Cerf, senior vice president of Internet architecture at MCI WorldCom Inc.

The group said it plans to research subjects ranging from the role of the Internet in privacy to the Internet's impact on taxation and health care.

Nuclear Power Plants Are Now Y2K-Ready

All 103 commercial nuclear power plants operating in the U.S. are year 2000-ready, according to Ralph Beedle, senior vice president and chief nuclear officer at the Nuclear Energy Institute (www.nei.org) in

Washington. During the past two and a half years, the nation's nuclear power industry has tested more than 200,000 items for Y2K-readiness. The 5% that required correction were fixed, according to the NEI.

Incoming Viruses

A report sponsored by Worldtalk Corp. in Santa Clara, Calif., found that 0.1% of inbound e-mail at U.S. corporations contains a known virus. An additional 0.7% has executables that may contain viruses that have yet to be documented.

Messages that contain large attachments such as graphics and audio or movie files make up 3.1% of inbound e-mail, and 0.2% of inbound e-mail contains jokes. Unsolicited commercial e-mail, or spam, makes up 5.6%.

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TECHNOLOGY

BUSINESS-SAVVY MONITORS

Wouldn't it be useful to see not only that a server had crashed but how that affected your business? A new API could make that possible. **94**

Y2K WARNING

If crackers use the year 2000 as cover to attack your systems, denial of service is most likely one of the weapons they'll use. We tell you what to look for and offer tips on how to protect yourself. **94**

DATA TAILORING

Fashion company Polo Ralph Lauren uses an object-oriented architecture to speed the creation of a data warehouse. **96**

EASIER WEB APPLICATIONS

Companies looking to create integrated Web applications with non-technical staff received a new tool chest from Reef SA last week. It combines functionality for e-commerce, discussion and user groups and more in one horizontal application package. **96**

NEW (OLD) GROUPWARE

Looking for cost-effective groupware for your intranet? Don't overlook the Net News Transfer Protocol, says author and consultant Jon Udell. **99**



Standardization, simplicity and stability are the keys to notebook reliability.

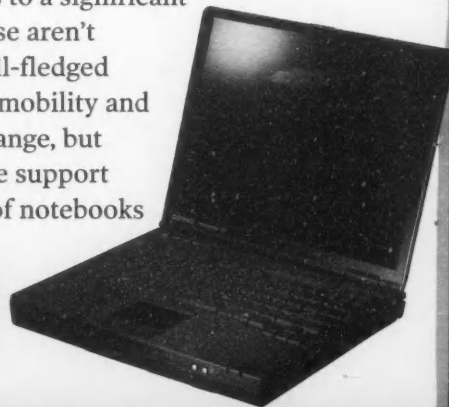
JAY DOMINICK, CIO,
WAKE FOREST UNIVERSITY,
WINSTON-SALEM, N.C.

NOTEBOOKS: LIFE IN THE LAPTOP LANE

SAY GOODBYE to the corporate desktop PC? Maybe. The mobile workforce will number almost 36 million workers in the U.S. alone this year, and IT departments are giving laptop computers to a significant portion of their knowledge workers. These aren't supplemental travel machines; they're full-fledged desktop replacements. Higher employee mobility and lower notebook prices are driving the change, but mobile computers bring their own unique support issues. We take a close look at the types of notebooks

IT managers support and how they're easing mobile computers into the workplace.

100





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API Lets Managers Monitor Networks

Open Group endorses standard that provides data about network crashes

BY SAMI LAIS

The Open Group consortium in Menlo Park, Calif., this month released the final version of the Application Instrumentation and Control (AIC) standard.

Applications built with this new application programming interface (API) go beyond the capabilities of standard network-monitoring tools because they let managers monitor the health of the business processes the network supports.

"You can buy tools to see if the network is up or down, but to see what the [business] process is doing is very difficult," said Jonathan Elvers, vice president and global program manager for systems management at J.P. Morgan & Co. The financial services firm worked

with Computer Associates International Inc. in Islandia, N.Y., to develop the API.

Many Options

The API includes about 100 application management variables from which a developer can choose.

If, for example, a trader using a Web-based reporting tool saw that a server had crashed, he would be able to determine if the crash made it impossible to enter trades or merely crippled a lower-priority reporting process, said Elvers. At the same time, systems managers would see not only the effect of the crash on the business but also network information, such as the type routinely collected via Simple Network Management Protocol

You can buy tools to see if the network is up or down, but to see what the [business] process is doing is very difficult.

JONATHAN ELVERS,
J. P. MORGAN & CO.

(SNMP) agents, and use that data to restore first the most critical business process.

"AIC lets you push instructions down to the application

and get information back," said Paul Mason, an analyst at International Data Corp. in Framingham, Mass.

The older Application Response Measurement API, created by Tivoli Systems Inc. in Houston and Hewlett-Packard Co. in Palo Alto, Calif., was only able to monitor applications, he said.

More Offerings

The final version of AIC also interoperates with the Common Information Model, which lets different management applications collect data from a variety of sources and provides for interchange of Common Information Model data with SNMP data.

If other enterprise management vendors "can get past the fact that CA brought this standard into the world, we could see applications with it available next year," Mason said.

By month's end, CA will ship the API as a maintenance option with Unicenter 2.1 and automatically include it in Unicenter 2.2, said Sam Green-

The Making Of an API

Some of the components of the AIC standard:

THE QUERY DEFINITION is used by the client API (application program interface) to query the business application.

THE HOST SERVICES define the interaction between the business application and the client API, allowing applications to communicate.

THE INTERACTIONS PORTION of the API defines what level of interaction the application has with the management framework.

blatt, CA's senior vice president of applied technology. ■

DEBORAH RADCLIFF/HACK OF THE MONTH

Is year 2000 really the ultimate hacker cover?

COMPUTER emergency response teams (CERT) around the country are gearing up to prevent massive denial-of-service attacks on the eve of the millennium. Crackers, they say, could be planning to take advantage of anticipated year 2000 chaos — or to create that chaos themselves to gain access to corporate systems or data.

Ken Van Wyk, chief technology officer at Para-Protect Inc., an Alexandria, Va., security firm, just returned from meeting with a Carnegie Mellon University CERT, where he learned of new massively parallel denial-of-service attacks that are powerful enough to make global service disruption a piece of cake.

While hanging out in Internet relay chat rooms, Gerry Zepp, president of

Enterprise Security Group in Atlanta, has heard a lot of talk about launching such attacks to boost what he calls the "FUD [fear, uncertainty and doubt] factor."

Even if thousands of such attacks happen in tandem on New Year's Eve, information security professionals may miss them, analysts say, because everyone would blame it on bad date code.

To help counter the threat, a primer on denial-of-service

attacks is in order. Let's start with the "smurf" attack.

All transmission control protocol connections from one server to another

require three handshakes. First, Server A pings Server B, which responds with a return ping. If an attacker sends a single-ping packet against the entire range of network IP addresses within a company

(which could be thousands), every single IP address will ping back in reply. The attacker spoofs a fake IP address to send all of those reply pings to a third, victim server of

his choice. Voila. The victim machine is overwhelmed and incapacitated.

While you can't defend yourself from such an attack, responsible

IT managers can keep their servers from being used to launch those reply pings to a victim server. Just turn off IP broadcast, a rarely used troubleshooting utility, says Zepp.

Other denial-of-service attacks go after vulnerabilities within operating systems and services.

The list of such attacks is too long to go into detail. Just visit Internet Security

Systems' Xforce (www.iss.net/xforce), type in the keyword *denial*, and you'll see 297 records pop up, ranging from Linux Red Hat buffer overflows (heck, all unpatched operating systems are vulnerable to buffer overflows) and Internet Information Server vulnerabilities. The only way to prepare for a Y2K onslaught is to test for denial-of-service attacks at least three weeks before New Year's, Zepp says.

But with clients going into year 2000 configuration freezes, Van Wyk says it's going to take "an act of God" to get any denial-of-service testing approved.

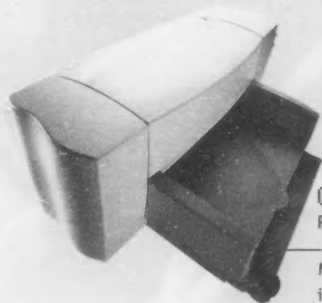
And heaven forbid if a CERT puts out an advisory of a new vulnerability in, say, mid-December. Many companies won't patch unless there's a huge reason to do so, Van Wyk adds.

Hate to say it, but you may be working New Year's Eve. Van Wyk and his staff will be. They're setting up watch teams at a number of his client sites on the eve of the millennium. ■



DEBORAH RADCLIFF is a contributing writer for Computerworld. Her Internet address is dradcliff@aol.com.

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CNET Reviews

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Objects Help Polo Speed Data Warehouse

Clothing vendor starts getting reports six months after starting project

BY DAVID ORENSTEIN

BUILDING a warehouse of corporate data is meant to speed decision-making. But the effort can backfire if it takes too long to translate data from different parts of the company into a format the warehouse can handle.

Developers at Lindhurst, N.J.-based Polo Ralph Lauren Corp. are using an object-oriented architecture to speed that work, allowing them to generate reports within six months of beginning the warehouse project, said Robert Abate, senior director of information systems at the clothing manufacturer and retailer.

The databases are wrapped in Java to appear as objects within Polo's three-tier architecture. They then can present interfaces to the application layer via messaging and enterprise application integration middleware.

The architecture was modeled logically using Cupertino, Calif.-based Rational Software Corp.'s Rational Rose. But because the databases require a relational approach, physical modeling was done with the data modeling tool Erwin from Computer Associates International Inc. in Islandia, N.Y.

The object-oriented approach made it easier to integrate new data sources into the data warehouse, or operational data store (ODS), so "each iteration [of the warehouse] took less time," said Abate.

Leaving the databases of its seven business units in place, the company built an ODS to produce unified Web-based reports, even though "each business unit is very much like a silo," Abate said.

Users who needed a report

from multiple units, for example, would in the past see multiple printouts. In fashion retailing, where getting a product to store shelves quickly can mean everything, streamlining the planning, merchandising and analysis is crucial. The company's 3T-byte ODS is fed by the legacy databases, using

tranet, shared with business partners or collected in marts to provide reports to a Web portal through reporting tools and applications. The ODS runs Oracle8 on Solaris servers.

Such a unifying architecture is a vision for many companies but is only becoming a reality

barked on similar efforts. "Polo Ralph Lauren is one of the earlier implementations of it, but not the only one," Kramer said. The industry is rallying around this centralized ODS model, he explained. "I think this is the ideal approach to it," he said.

The total cost of building and implementing the necessary architecture can easily run in the low millions of dollars, Kramer said, but the benefits of making data more consistent justify the cost.

To achieve such uniformity, the data in the ODS had to be converted into common formats, even though the end users in each business unit still needed to view and manipulate data as they always had.

Polo found a common data format in the Voluntary Interindustry Commerce Standards. The standard, popular among retailers and wholesalers, allows the company to bridge differences, such as the fact that a wholesaler views an "inventory unit" as a case, whereas retailers view an "inventory

unit" as an item, Abate said. ▀



ADDING FUNCTION TO FASHION on Polo's IT team are (from left) Reuben Tungol, Robert Abate, Joseph Burke and Jorge Vargas

data extraction and transformation software from Palo Alto, Calif.-based Informatica Corp., Abate said. From the ODS, the data can be staged for delivery to a supply-chain in-

for some, said Mitchell Kramer, an analyst at Patricia Seybold Group Inc. in Boston. Kramer has consulted with financial companies in Boston and St. Louis that have em-

MOREONLINE

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www.computerworld.com/more

Reef App to Untangle Web for Nontechnies

Suite to support existing standards

BY LEE COPELAND

Companies looking to create integrated Web applications with nontechnical staff received a new tool chest from Reef SA last week. Brussels-based Reef's Internetwork 2.0 application suite combines functionality for e-commerce, discussion and user groups, Web publishing and workflow management in one horizontal application package.

The Internetwork product suite uses a middleware layer to handle object requests, database connectivity and search capabilities and supports Java Database Connectivity, the

Web languages HTML and Extensible Markup Language, and the Lightweight Directory Access Protocol.

Support for standards differentiates Reef's approach from that of its competitors, said analyst David Truog at Forrester Research Inc. in Cambridge,

Mass. "[Reef is] delivering a technology that is very much built on standards and an open architecture, the way a lot of older competitors are not," said Truog.

"When a lot of the older players started, just five years ago, all there was was a Web

communications infrastructure, so they built proprietary systems from scratch," said Truog. "A lot of companies are now saddled with products built on software that is quickly becoming legacy."

Reef customer Stuart Magrath, Internet business manager at NRMA Insurance Ltd. in Sydney, Australia, said he recognizes the value of having an application suite based on open standards.

Internetwork was also designed to let nontechnical personnel generate Web content.

Arthur Goodrich, vice president of marketing at Phoenix-based Alliance Medical Corp., is using the Reef application set to develop a Web site that includes Web-accessible account history, technical documents, demonstrations and live video feeds that showcase his firm's medical equipment sterilization service.

Reef consultants helped Goodrich quickly map out the company's Web application needs and set up the integration points into its J.D. Edwards & Co. enterprise resource planning system.

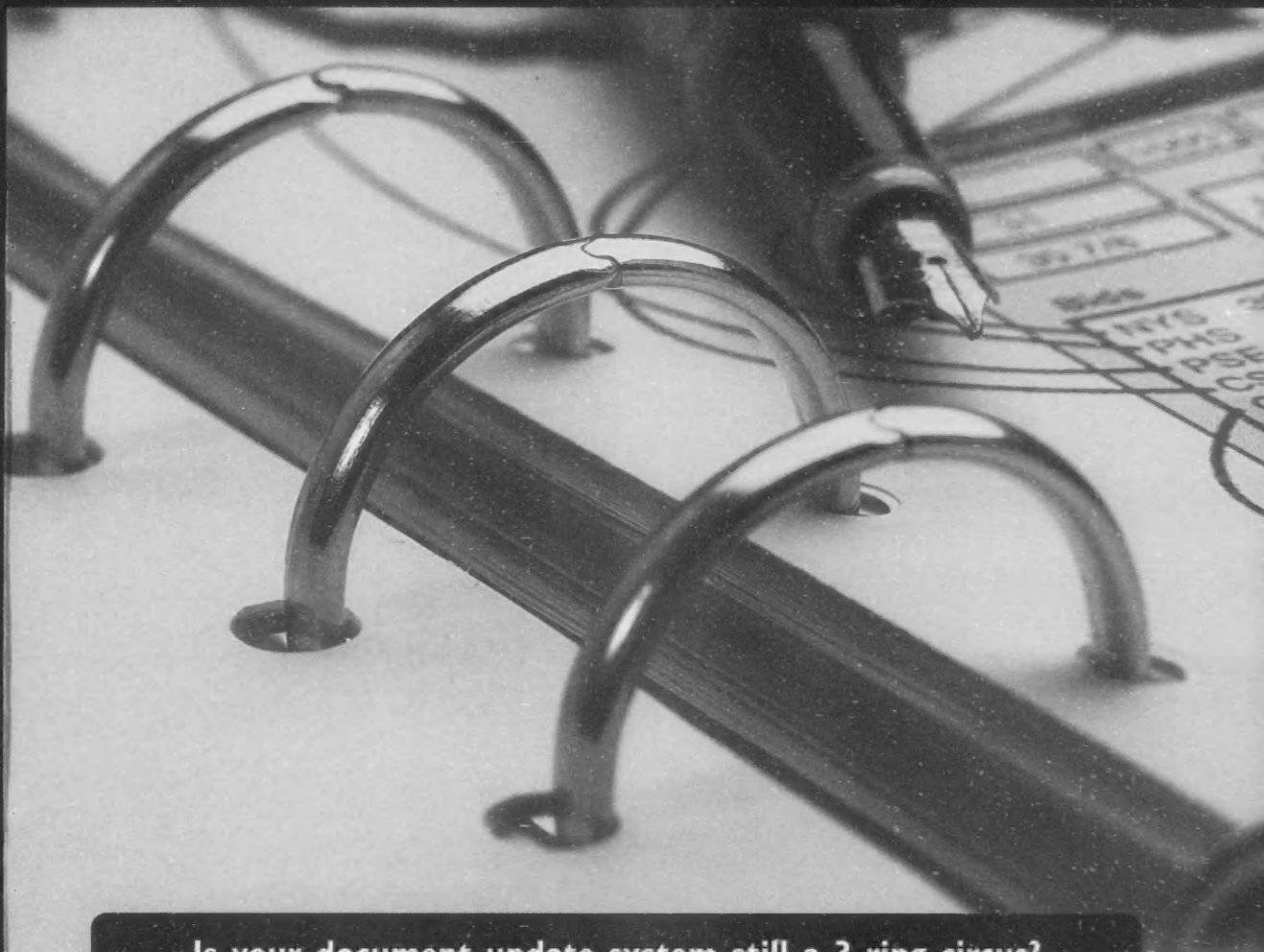
"We don't have an HTML programmer on-site, so we want to be able to do it ourselves," said Goodrich. "If you develop and create the architecture correctly, we only have to change the content."

Goodrich said he wants to be able to update and add new applications as needed without having to hire outside technical talent.

Available by month's end, Internetwork 2.0 includes Reef Commerce, Form Manager, Forum, Publisher and Tribe Manager. Pricing starts at \$30,000 for a server site license or \$700 for a monthly lease from Reef's application service provider partner MCI WorldCom Inc. ▀

Internetwork 2.0 Features

MODULE	FUNCTION
Publisher	Creates, publishes syndicates HTML pages
Commerce	Sets up virtual stores with catalog, shopping cart, pricing and search capabilities
Community	Creates and manages content from online forums and discussion groups; includes interactive question-and-answer tools
Process Enabler	Adds workflow capabilities to application creation process



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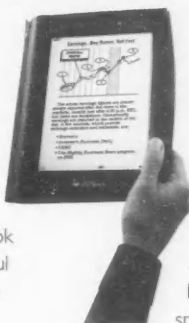


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Yahoo Messenger
for Win CE, Macs

Yahoo Inc. in Santa Clara, Calif., announced new versions of its Messenger instant messaging service for Palm Computing Inc. and Apple Computer Inc. Macintosh-based devices as well as palm-top devices running Microsoft Corp.'s Windows CE.

Messenger is now available for Palm Computing's Palm III, IIIx and V operating systems; Compaq Computer Corp.'s Aero; Hewlett-Packard Co.'s Jornada; and Casio Computer Co.'s Cassiopeia, according to Yahoo. The new versions can be downloaded from <http://mobile.yahoo.com>.

Bell R&D Online

Lucent Software Solutions Group will post intellectual property developed by Bell Laboratories, Lucent's research and development arm, on a business-to-business Internet site called TheLicenseStore.com. Lucent has contracted Cool License Corp. as the "online listing agent" for the intellectual property. The site will shorten and simplify the licensing process for intellectual property, enabling other developers and integrators to quickly incorporate it into their own products. The postings are maintained in a searchable database, and registered users can browse the site at no charge.

Latin America
Taps Internet

The number of Internet users in Latin America will increase from 9 million this year to 38 million in 2003, making it the region with the fastest growth in online users, according to market figures released last week by Jupiter Communications Inc. in New York. Currently, only 1.8% of Latin America's population has access to the Internet, a figure that's expected to rise to 6.8% in 2003, Jupiter said in a statement.

JON UDELL

Cost-effective groupware
for corporate intranets

WE'VE BECOME ADDICTED to e-mail and the Web, but we've been sadly underusing Usenet-style conferencing based on Net News Transfer Protocol (NNTP) clients and servers. The Usenet, an Internet-based public-access network for e-mail and special interest groups, gets a bad rap in the corporate world because its valuable content is overwhelmed by spam, smut and nonsense.

Thus, few users have discovered the rich groupware features built into modern newsreaders, the software used to browse and read messages on Usenet. And few companies have learned how information that accumulates in the public spaces of intranet newsgroups can be much more valuable than if it's confined to private e-mail messages over the Usenet.

Almost everyone uses a Netscape or Microsoft browser that includes a powerful, modern NNTP client that can:

- Compose and display HTML messages.
- Automatically encode and decode binary attachments.
- Communicate securely over Secure Sockets Layer (SSL).
- Authenticate using client certificates (digital identification).
- Exploit powerful synergies among e-mail and newsgroups.

These capabilities make NNTP conferencing a killer application for knowledge exchange on the intranet. For example, Communicator's Collabra and IE's Outlook Express can both render and compose HTML that uses tables, in-line images (which can be dragged and dropped into place), hyperlinks, fonts and color — and do it in a WYSIWYG manner.

In fact, an HTML-aware newsreader talking to an intranet NNTP server comes very close to fulfilling the Web's original collaborative vision. In this environment, team discussion is freed from e-mail's limitations. Instead of being distributed haphazardly across a set of e-mail in-boxes, group discussion can build a searchable collection of rich documents that can refer to intranet- or Internet-based resources, just like Web pages.

Lotus Notes this isn't — no user-defined fields, for example. But it's much more interactive and flexible than an intranet Web server, and it plays to a universal client already in use by your staff and also transient collaborators, customers and business partners.

INN, the traditional Unix NNTP server, is legendary for its complexity and crankiness. But modern NNTP servers like Netscape Collabra and Microsoft's NNTP Service aren't like that. They run on NT as well as Unix,

so nonwizards can use them; they support SSL connections, full-text search and configurable privacy zones; and they integrate with directory services.

All this is fairly easy to set up and manage. The hard part of NNTP is periodically replicating external newsgroup feeds onto your server and then periodically replicating your server's newsgroups (with its additions) to the entire Usenet. So don't do it! Skip Usenet replication. You still have access via DejaNews.com and RemarQ. Use local newsgroups to solve problems that aren't being solved, like internal collaboration and customer service.

Secure newsgroups are especially overlooked. The Internet is a great way to deliver "anywhere, anytime" access to team discussions and shared documents. But NNTP's password system, like HTTP's, is weak. So run a secure NNTP server. Modern newsreaders can use SSL to encrypt data streams just like browsers. Many companies are beginning to rely on secure Web-based mail and calendaring. Why not secure NNTP conferencing too? It's readily available, just poorly understood.

When you ask why groupware systems fail to reach critical mass, analysts usually point to a common dilemma. Everyone benefits from tapping into pooled knowledge, but contributors aren't rewarded. I suggest the answer is to appeal to people's enlightened self-interest, not to the common good. For several years, I ran a development team that discussed ongoing work in team newsgroups and posted all project-related documents there. We could have used e-mail and our local file systems, but as we got into the habit of posting documents to our own newsgroups, we found it just as easy. And because we all worked from multiple machines and multiple locations, having central and searchable newsgroups paid off big. That's enlightened self-interest at work. ■

Few users have discovered the rich groupware features built into modern newsreaders.



Udell was Byte magazine's executive editor for new media and architect of www.byte.com. Now an independent Web/Internet consultant, he's the author of *Practical Internet Groupware* (O'Reilly, 1999). He can be reached at <http://udell.roninhouse.com>.

Noteworthy Notebooks

There's a very good chance your next office-issue computer will be a notebook model. With so many different types of needs, picking the right laptop is crucial. Here's a rundown on what's available, why they're configured like that and how some organizations are using them By Russell Kay

BECAUSE YOU WORK with computers (and if you don't, why are you reading this?), you know that you need certain features and capabilities in your computers and your applications. The problem is, everyone needs a different set of things. In the software world, this situation results in overgrown applications like Microsoft Corp.'s Word. In the laptop hardware world, users are more realistic about making choices because they know they can't have everything in one package — and still carry it on their shoulder.

Responding to the growing market for laptops, vendors have begun offering a variety of machines that are often very different from one another because they're tailored to fit a specific group of users. After looking over a wide cross-section of what's out there, *Computerworld* sees four basic market segments and, within the business markets, six user profiles. The markets are the following:

- **Home/student:** Economical but full-featured machines mainly for the casual user.
- **SOHO:** Full featured, leading-edge

technology for small-office or home-office (SOHO) users.

- **Corporate standard:** Machines that offer stability and support.
- **Loss leaders:** Products in which features matter less than price.

A Notebook Taxonomy

After examining the laptop marketplace, we've divided the spectrum of laptops into six categories, each aimed at a different group of users, with differences based primarily on size, weight and features. We came up with the following categories:

- **Tiny-9x**
- **Mighty Mini**
- **Superslim**
- **Slicer**
- **Corporate Standard**
- **Desktop Do-All**

Bear in mind that these groupings represent *Computerworld's* take on the industry, not that of any particular vendor. Also, for any given maker's line, a specific laptop may sometimes fit into two or even three categories.

Tiny-9x

These are the smallest full-fledged laptops that run Windows 98 and, thus,

all the Windows applications. (We're not considering any of the Windows CE-based computers — palm-size and handheld PCs or Jupiter-class machines — in this report.) Typically, these are less than 1 in. thick when closed, with a color display no bigger than about 10 in. They have a built-in hard drive, but everything else has to hang off on a cable, making them one-spindle machines (see sidebar, "Count Your Spindles"). They weigh between 2 and 3 lb. Examples include Toshiba Corp.'s Libretto and Sony Corp.'s Vaio PictureBook PC-1X [Technology, April 19]. These are the computers you pick when weight and size are absolutely the most important considerations. But you pay a price, with keyboards considerably smaller than standard. With their limitations, however, they're a lot of computer in a tiny package. *Target users: People who want the smallest possible full-fledged computers — and have small hands.*

Mighty Mini

These are a bit larger than the Tinies but smaller than the big Superslims. They're 3-lb. machines with 10- to 12-in. screens and nearly full-size keyboards. They typically have 64M bytes of RAM and 6G-byte or larger hard drives. CD and floppy drives are external, but designers have shown a variety of imaginative ways to package those outside extras. The Mighty Mini laptops attract a lot of attention because they're so small on the outside and yet so big in terms of usability. Standout machines include IBM's ThinkPad 240 (see review, page 110), Sharp Electronics Corp.'s Actius A280 (see review, page 111), Compaq Computer Corp.'s Armada M300 (see review, page 110), Sony's Vaio 505 line and Acer America Corp.'s TravelMate 340 series (see

APPLE'S
POWERBOOK 63:
An often overlooked
Desktop Do-All



review, page 112). *Target users:* Business travelers who move around a lot and need lots of power in a light, small and practical package.

Superslim

Where the Tiny-9x downsizes everything, these PCs take a different tack. Most are still relatively light, at 4 lb. or so, with big screens (up to 14 in.) and ultrathin profile, typically 0.75 to 1 in. thick when closed. Examples include Toshiba's Portégé 3000 series, Dell Computer Corp.'s Latitude CS (see online review, www.computerworld.com/more), Compaq's Armada M700 and Prosignia I70 (see review, page 112) and IBM's ThinkPad 560. To achieve their slim profiles, most but not all are one-spindle machines. *Target users:* The image- and style-conscious and those who travel a lot but need bigger screens and keyboards.

Slicer

These are almost a subcategory of the previous group, except that a few systems here weren't designed for thinness. Recognizing the problems inherent in external drives, vendors decided to make it possible to expand these machines by fitting them onto a custom-designed expansion base, sometimes called a "slice," that typically contains bays for a CD-ROM or DVD drive, a floppy disk drive and an extra battery or hard drive and that may offer more external connectors, such as a built-in network adapter.

In the best of this group, the base may add less than 0.5 in. of thickness to the combined package. Because they seem to offer the best of both worlds — thin, but full-featured when needed — these computers have intrigued a lot of users in the past few years. The original Slicer was Hewlett-Packard Co.'s 1998 Sojourn, but it was super-pricey and somewhat fragile.

Current standard-bearers in this group are IBM's popular ThinkPad 570, Toshiba's Portégé 7000 series and the least stylish but most efficient of the group, the Compaq Armada M300 (see review, page 110). Yes, we already (and correctly) classified the M300 as a Mighty Mini; it truly belongs in both groups. *Target users:* Pragmatic workers who need all their accessories at the desk but also travel a lot.

Corporate Standard

These are long-lived, standardized-configuration notebook computers designed and engineered with the special system life cycle needs of information technology in mind (see "Big Biz, Little Biz" at right). They may be three-spindle notebooks, though there's an increasing move to two-spindle designs. Their designers have given size- and weight-saving lower priorities, because these notebooks aren't targeted at fre-

AT A GLANCE

Count Your Spindles

Notebooks are often described with reference to the number of "spindles," or separate storage drives that the machines can support internally.

Zero-spindle: Jupiter-class machines, like Compaq's Aero 8000, which are in many ways very close to something like Sharp's Actius A280 or Sony's Vaio 505S, but with no hard drive. Instead, the machine relies on solid-state removable memory for storage.

One-spindle: Has a hard disk inside, everything else must hang outside, generally connected by cables.

Two-spindle: Has a hard drive and one other disk, which can be fixed in place or located in a drive bay that lets you substitute one drive (floppy, CD-ROM, DVD-ROM, LS-120, Zip) for another (or sometimes a second battery in place of the disk drive).

Three-spindle: Has everything built-in, so you can access your hard drive, floppy and optical storage without having to swap anything out.

quent travelers. As a result, weights range from 5 to 8 lb.

Because they aren't necessarily small and light, these machines can often be made with larger, cheaper components. They can have high-speed processors, lots of memory and really big hard drives. Representative machines include Dell's Latitude CPi series (see review, page 114), IBM's ThinkPad 390 family and its more upscale ThinkPad 600E (review, page 116), Compaq's Armada E700, and Toshiba's Satellite Pros. *Target users:*

Everyone for whom power is more important than size.

Desktop Do-All

These notebooks are designed to do everything, with lowest priority given to size and weight. This is the machine you want to use for (if not carry to) multimedia presentations for a client. Typically three-spindle machines with 14- to 15-in. screens, these computers start at 7 lb. and go up. Often they have DVD drives and quite good built-in sound quality. These are often the top-end notebooks in any maker's line — for example Gateway Inc.'s Solo 9300XL (see review, page 116), Dell's Inspiron 7000, Micron Technology Inc.'s Transport NX, Compaq's Armada E700 and Toshiba's Tecra 8000. Another good machine that shouldn't be overlooked is Apple Computer Inc.'s PowerBook G3 (see review, page 116), as well as its upcoming G4 successors, although their primary appeal is to graphics professionals wedded to the Macintosh.

Whether Desktop Do-All machines will stay around much longer is hard to say, as they are increasingly being superseded by the Superslims, Slicers and Corporate Standards. Still, when you want to have everything in one box, with nothing dangling from a cable, this is definitely your machine.

Target users: General office users who rarely travel, marketing and sales reps, consultants and artists. ▀

Big Biz, Little Biz

In considering IT views on laptops, it's helpful to explain the difference between **SOHO** machines (e.g., Compaq's Prosignia line or Round Rock, Texas-based Dell's Inspiron family) and **Corporate Standard** units (Compaq's Armadas, Dell's Latitudes).

SOHO machines are for organizations that buy a small number of computers at a time. Corporate standard computers are designed for large IT departments that roll out hundreds or thousands of computers during a long time period. While features matter, IT departments also need guaranteed availability of the same machine (including identical internal components) in 12 months.

SOHO users want leading-edge technology and highest performance. Corporate machines are more conservative, built on proven platforms guaranteed to be around for a specified time. For example, Compaq says that its Prosignia line provides "dynamic transitions as new technology is available" and "up-to-the-minute notebook technology" but that its Armada line offers "managed transitions, with extended life cycles" and "up-to-date, industry-standard technology."

In designing its Latitude CP laptops, Dell had big corporate customers in mind. "We believe it was important to start off with a quality, viable mainstream solution for companies

that would do large rollouts," says Tim Peters, product manager at Dell. Dell believes the best machine for this market is a thin two-spindle design, said Peters, but he added that rigid differentiation is misleading. "Notebooks are crafted with so many considerations . . . that we believe there are necessarily different solutions for different needs."

With this in mind, Dell expanded the line this year with the Superslim 4-lb. Latitude CS. "It delivers that same performance and cost effectiveness in a thinner and lighter platform," Peters says. It benefits "people who are more mobile and willing to make a trade-off or who, when they get to another location,

will find modules and docking stations they can borrow or use." Price and stability are another area of compromise. "There are large organizations that have a preference for common-

ty of docking and will trade off lower cost for technology that changes more rapidly. Their rollouts are done in a batch mode, not over a sustained period," says Peters. For such customers, hardware compatibility is sufficient; they don't need each machine to be the same.

The stability of the Corporate Standard notebooks lets IT use docking stations, hard drives, CD-ROMs, batteries and other components among several machines. This translates into better service for users, lower cost to IT and a support staff with a better knowledge of the hardware. — Russell Kay

IN THIS REPORT



IT Puts Up With Portable PCs

FEATURE STORY

When an organization decides to outfit a significant number of its employees with notebooks instead of desktop computers, a whole new range of support and maintenance issues come to the fore. In the end, it's an economical route for many in terms of total cost of ownership, because one computer costs less to buy and support than two. ▀ 100

Users Like Their Notebooks

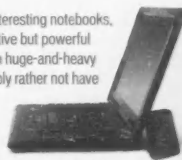
SURVEY RESULTS

In a brief survey of Computerworld readers, most laptop users are surprisingly satisfied with their laptops, but some aspects are commonly down-rated. ▀ 106

A Bumper Crop Of Notebook PCs

REVIEWS

A look at 10 interesting notebooks, ranging from diminutive but powerful travel companions to huge-and-heavy laptops you'd probably rather not have to carry far. If you can't find one here that sounds interesting, you probably don't need or want a notebook! ▀ 110



User Profiles


USER PROFILES

Rather than rely entirely on our own opinions and assumptions, we asked several laptop users to tell us what laptop they use, plus why and how they use it. ▀ 105

More Online


REVIEWS

Even with a last-minute increase in pages for this report, we still couldn't fit everything in. Also, some of the reviews here had to be trimmed slightly. For more, including a look at the Macintosh end of the notebook spectrum, visit our Web site. ▀ www.computerworld.com/more



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IT Puts Up With P

As portable computers become end users' only PCs, IT should play a big role in selecting and supporting those notebooks. It makes sense — and dollars, too

By David Essex

NOTEBOOK PC vendors have for several years used the presumptuous term *desktop replacement* to describe their fully equipped, big-screen machines. It's easy to accept, at least regarding technical needs, that a portable computer could serve as the only PC for many users. But this has only begun being translated into practice in the past year, as numerous companies have instituted department- or companywide notebook installations — and as vendors have created new programs to service notebook-intensive sites.

Product managers at the top-tier notebook makers say they're seeing a marked increase in the number of customers buying portables to replace desktop PCs. Most can cite specific corporations making the switch. "We believe the timing is finally right for the desktop to finally be replaced by the notebook," says Dell Computer Corp. spokesman Rob Crawley.

"Customers are coming to us requiring a desktop replacement notebook," says Dan Lowden, North American mobile brand product manager at IBM's ThinkPad division. "We had some customers who were 30% mobile that are now 90% mobile." Lowden says, acknowledging that many are consultants and pharmaceutical sales representatives, among whom "the demand to be portable is so huge." Lately, the attitude of some information technology managers has been: "This is a notebook, and it's the only machine you're going to get because it hits all the requirements," Lowden says.

"Notebook demand this year has been far greater than expected," says Katrina Dahlquist, an analyst at International Data Corp. (IDC) in Framingham, Mass. Looking at projected U.S. growth rates for this year, Dahlquist says that the 20.9% for notebooks is still below the 29.1% for desktops and that notebooks' 17% share of total PC sales (46.4 million units) is near the historic average. First-half notebook sales have been "phenomenal" despite an LCD panel shortage, Dahlquist says, adding that she has definitely seen a corporate move to notebooks, especially for new employees.

What's Driving the Trend to Notebooks?

Higher power, lower prices

Several factors contribute to this long-predicted coming-of-age of notebook computers. The most obvious is rough technical parity. With sharp color screens, 500-MHz processors, hard drives exceeding 10G bytes and lots of RAM, notebooks perform close to the top range of desktop PCs. Nearly all corporate databases or software development projects, let alone word processors and spreadsheets, can be comfortably run on a notebook.

On a more practical level, notebooks have only recently achieved no-compromise storage, previously one of the best reasons to maintain a desktop setup. Space constraints have prevented notebooks — especially the lightest and thinnest — from having the desktop-standard configuration of a hard drive, floppy drive and CD-ROM or DVD-ROM. But many desktop-replacement and high-end multimedia notebooks now have all three. And comput-



ers that lack all three usually have drive bays that can hold more than one type of device, letting users swap floppy and optical drives or install a second battery and double battery life.

Ironically, all-in-one notebooks may bring about the obsolescence of the docking station, a device that was originally created to help notebooks replace PCs on the corporate desktop. That device provides permanent network and power connections, displays

the notebook's screen on an external monitor and often adds a large hard drive and other storage devices. Several notebook vendors have noted a drop in sales of docking stations, while demand for port replicators — much smaller appendages designed to simplify notebook connections to desktop devices and corporate networks — is on the upswing. "We don't recommend docking stations to our clients, but we do recommend port replicators," says

Portable PCs

WAKE FOREST UNIVERSITY
CIO Jay Dominick says
standardization campuswide
on IBM ThinkPads has been key
to notebook reliability

Making the Business Case

The bottom line on portables' TCO
With purchase price providing no comparative advantage, the case for replacing desktop PCs with notebooks has to embrace other factors — productivity gains, convenience, workstyle improvements and savings in other areas. If the 10 organizations interviewed for this report are any indication, the total cost of ownership (TCO) story is gaining popularity. Most of them cite Gartner, a leading TCO consultant.

According to September 1998 Gartner numbers, notebooks' higher annual TCO of \$11,746 (compared with \$7,449 for desktops) is easily recouped by extending the workweeks of mobile employees by one-half to three hours, depending on salary. Consider a highly compensated "day extender" who works extra hours by carrying a laptop home, for an 80% to 20% ratio of office to mobile or remote use. If his salary and benefits add up to \$140,000, the company would make up overall notebook costs by lengthening that employee's average annual workweek only a half-hour. At the other end of Gartner's scale, an employee with 80% mobile use making \$56,000 including benefits must work three hours more per week, largely because of a higher TCO for the more mobile system.

Dulaney sums up the Gartner findings this way: "The TCO of a two-system employee is huge — it's well over \$15,000 a year. There's really no reason to give people two machines anymore."

Reports From the Field

Laptops throughout the land

Those dynamics appear to be affecting the makeup of the mobile workforce, which is 35.7 million people strong this year, according to an IDC study, "Where's the Office: The U.S. Remote and Mobile Worker Market Review and Forecast." The total includes desktop users, but 14.45 million are workday extenders and 10.2 million are mobile professionals — most of those presumably using notebooks, Dahlquist says. The rest are telecommuters (9.75 million) and mobile data collectors (1.3 million).

How many of these workers are in all-notebook organizations? The supporting evidence is purely anecdotal.

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USER PROFILES

Dan Adams

LAPTOP CATEGORY: CORPORATE STANDARD

Job: Director, clinical information systems, Boys Town National Research Hospital, Omaha

Time Traveling: 5%

Laptop: Toshiba

Who Chose: Purchasing department

Why Chosen: Price, primarily for use on the road

Comment: Doesn't use his laptop that much, but when he does, he plugs in a mouse. "That gives me more control. ... It's a lot lighter than the Zenith I had 10 years ago, which must have weighed 30 pounds."

Steven Engel

LAPTOP CATEGORY: SUPERSLIM

Job: Manager, Network System Engineering, The Minnesota Mutual Life Insurance Co., St. Paul

Time Traveling: 20%

Laptop: IBM ThinkPad 600 with docking station



Who Chose: The information technology department

Why Chosen: Its light weight

Comment: Likes the 14-in. screen size and the relatively lightweight features. He considers it a vital part of his work, but something he's taken for granted. "I don't give that much thought to the kind of machine, actually."

Randy Kouns

LAPTOP CATEGORY: SLICER

Job: Remote Access Support Specialist, Chatsworth Product, New Castle, Ind.

Time Traveling: 20%. "However, my

User Profiles, page 109

Ken Dulaney, an analyst at Gartner Group Inc. in Stamford, Conn., which has been counseling corporations about desktop replacement decisions.

Another seemingly unrelated trend — the rush to fix Y2K problems by year's end — may also be fueling the desktop replacement phenomenon. According to Lowden, many IBM customers early this year were faced with upgrading 4- to 5-year-old desktops. "They said, 'Let's just replace every-

thing with a notebook,'" Lowden says.

Finally, notebooks are more affordable. High-end performance machines that typically fetched \$5,000 two or three years ago now go for \$3,000 to \$4,000, and economy models have dipped well below \$2,000.

But notebooks, harder to manufacture and more vulnerable to spikes in component prices, still sell at a premium, and that gap widened with the arrival of sub-\$1,000 PCs last year.

Survey: Users Like Their Laptops

All laptops are terrific on the spec sheets, and published reviews are more often first impressions than reflections from using the computer over time. But you can't fool the users, so that's whom we asked.

Most users of notebook computers generally are pretty happy with their machines, regardless of brand. That's the primary conclusion from a telephone survey of 53 laptop computer users conducted for *Computerworld* by Information Resource Group in Sterling Heights, Mich.

The randomly selected users reported on six brands: Dell, IBM, Compaq, Toshiba, Hewlett-Packard and Gateway, in order of decreasing frequency. Half of those surveyed used a notebook as their only computer, and members of this group were the most satisfied with their computers. However, none of the respondents indicated dissatisfaction with the notebook overall.

Not everything turned up roses. By a very slight margin, Compaq, Dell and IBM laptops scored higher than the other three, and Gateway alone was rated noticeably lower—but still satisfactory overall.

The responses became more interesting when users were asked about how satisfied they were with specific features of their machines. The lowest satisfaction was with battery life, and

this held true across all brands. By a small margin, Dell rated highest and Toshiba lowest. But nobody rated battery life high—it averaged 3.6 out of a possible high score of 5.

In other features, IBM's display screens were rated highest and Toshiba's poorest, though overall variation was fairly small. IBM also had the highest-rated pointing device,

the trackpoint, while poorest marks went to HP and Gateway. However, Gateway's keyboard ranked considerably above the rest, with the relatively flat keyboards of Compaq and HP bringing up the rear.

With respect to individual features, HP got the most inconsistent ratings across 13 categories, scoring highest in some categories and lowest in others. In one notable inconsistency, users rated HP highest in reliability, but by a wide margin they said they wouldn't recommend it to others. Only Gateway was in the same league for negative recommendations. Curiously, in a separate question, respondents rated their overall satisfaction with HP higher than all the other brands.

—Russell Kay

SURVEY RESULTS

What Did People Like and Dislike, by Brand?

LIKE:	REASONS:
Compaq	Size, looks, ease of expandability
Dell	Construction, battery life, disk size
IBM	Display quality, trackpoint, expandability
Toshiba	No single feature rated high
HP	Reliability, weight, construction, ease of use
Gateway	Keyboard
DISLIKE:	REASONS:
Compaq	Keyboard
Dell	Limited expandability
IBM	No features rated low
Toshiba	Construction, battery life, overall power
HP	Display quality, pointing device, desk space
Gateway	Reliability, weight, ease of use, pointing device, size

Continued from page 105

"We are definitely not seeing it sway 100% to notebooks," says Chris Abate, group product manager at Toshiba America Information Systems Inc., but he notes that some customers have made the transition, and the education market is showing marked growth. Mike Stinson, director of product marketing for desktops and notebooks at Gateway Inc.'s business division, says few customers have made a full commitment to notebooks. "There will continue to be a need for desktops, both because of performance and cost," Stinson says. "I wouldn't predict that notebooks get more than 30% penetration across a business."

Learn to Think, Get a ThinkPad

Notebooks both aid and change the learning experience at Wake Forest

One place you'll find that the word notebook is synonymous with personal computer is Wake Forest University in Winston-Salem, N.C., which four years ago made a commitment to give each of its approximately 4,200 undergraduate students and faculty members notebook computers. "We wanted a comprehensive provider," says CIO Jay Dominick, recalling the vendor selection process. "We were an all-Apple campus." After considering Hewlett-Packard Co. and rejecting Dell and Gateway, the university chose IBM, whose ThinkPad notebook division is in Raleigh, N.C. IBM offered volume discounts (helping Dominick meet a \$3,000-per-system budget) and stationed a technical support person on campus for the first two years.

Today, everyone has either an IBM ThinkPad 385XD or a 390E with a healthy 128M bytes of RAM, a 6G-byte hard drive, a 14.1-in. screen, a 56K bit/sec. modem and a 10/100 Ethernet card. The standard-issue software includes Windows 95 or 98 and Microsoft Office 97. "Thirty-five percent of the students have their own Web pages," says Dominick. They also use their ThinkPads to access online journals, course materials posted by professors and password-protected discussion groups. Everyone keeps in frequent touch via e-mail.

Though notebooks have long had a somewhat unfair reputation as being prone to mechanical failure, Dominick says the ThinkPads have been pretty reliable. Most repairs are done on campus by Dominick's staff, and a pool of loaner units containing a standard software "image" more or less ensures any user can get back to normal operation within hours. A 13-person help desk, plus two students and a resident in each dormitory, provide technical support. In practice, Dominick says, support comes from thousands of students and faculty. "There's an enormous informal support infrastructure, because

the machines are all the same," he says.

The university also subscribes to IBM's EasyServ repair service, which uses overnight delivery. Another standard-issue program, Symantec Corp.'s Norton Antivirus, gets upgraded nightly on any notebook that's logged on to the campus' Windows NT network. Half the systems are upgraded every two years, and graduating seniors take their notebooks with them.

Standardization, simplicity and stability are the keys to notebook reliability, says Dominick. "From a service standpoint, desktops are not all alike," he says, citing frequent changes in hard drives and video cards. "Laptops are built to much tighter standards." If there's one weak spot, it's the propensity of some students—mostly freshmen—to install their own software such as MS-DOS-based games and communication programs. "The single worst-behaved app we have on-campus, bar none, is AOL," Dominick says, because America Online Inc.'s client software makes changes in the Windows network control panel that "mess up our network mask."

Having computer power everywhere enables new ways of doing things. One unexpected result, says Dominick, is a greater demand for Web-based access to administrative departments such as payroll. Students are dreaming up their own applications: an online used-book mart, for example. To information systems professor Gordon McCray, the networked, multimedia notebooks make it easier to tailor course materials to students' learning styles. They also foster new types of collaboration and distance learning. "There are few places you can sit down on this campus and not be within arm's reach of an Ethernet connector," says McCray.

Using What You Sell

Intel notebook use: from many to most

The IT department at chip-making giant Intel Corp. in Santa Clara, Calif., has seen strong demand for mobile computing from its employees since the mid-1990s. But the company really began taking notice about 18 months ago, when Gartner formulas showed that notebook TCO was just \$800 more than that of desktops. "It became really obvious it was a good idea to spend the \$800," recalls Doug Busch, Intel's vice president of IT. Today, a formal acquisition program that started in early 1998 has provided notebooks for 26,000 of Intel's 65,000 worldwide employees. The goal is a 70/30 notebook-to-desktop ratio by 2001.

It's Intel's policy not to name suppliers, so Busch will say only that the standard hardware configuration of the company's laptops is a 366-MHz, Ethernet-enabled system with 128M bytes of RAM, a CD-ROM drive and the

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biggest hard drive available. Each notebook is expected to last at least three years. CRT monitors are frequent desktop additions, though Busch says he's noticed users tend to drop the CRT and use only their notebook's active-matrix color screen as they gain experience with the system.

The program itself, the determination of criteria for success (the main one being a good supply chain that would support the same configuration around the world) and subsequent vendor selection, all originated in the normal course of decision-making in Busch's IT department. "Obviously, we informed Andy and Craig what we were doing," says Busch, referring to Intel Chairman Andy Grove and President and CEO Craig Barrett.

Now, members of Intel's assembly/test/manufacturing team, spread out across 18 times zones, have constant access to the network and their team data. Busch says this high-availability computing is altering the nature of collaboration, with more team interaction and online editing of information.

The rollout has had its minor problems. Busch says a lack of standardization among worldwide network connections caused headaches. "Trying to thread your way through local [private branch exchanges] is always an interesting experience," he says. Intel employed an aggressive, expensive solution by installing local points of access around the world. It's now working on other links, such as virtual private networks and cable and Digital Subscriber Line modems. IT is prototyping a wireless network, though its slower performance is a clear disadvantage. Busch also expresses strong interest in Bluetooth, an emerging wireless standard for low-cost, short-distance networks.

Power management is another challenge. "It's mostly an issue of user education in how to use suspend and resume," says Busch. He says he expects

We're pretty darn near a paperless company — everything is online.

DIANE WIMMER, DIRECTOR
OF NETWORK SERVICES,
PEOPLESFT INC.

help from next year's Mobile Pentium III SpeedStep technology, which purportedly will extend battery life by running notebooks at two power levels, depending on the power source.

Service and support are the responsibility of an internal help desk, though Busch says he's looking into both service contracts and overnight repair depots. A few special requests for service on nonapproved systems and executive gadgets are handled case-by-case.

"There's no privileged class of folks who get to ignore our standards," Busch says.

Growing Acceptance

Why sync? Just get a desktop replacement laptop

According to vendor and corporate sources, other companies moving toward notebooks are Deloitte & Touche, The Boeing Co. and New York Life Insurance Co. "Virtually everyone" in worldwide marketing at Eastman Kodak Co.'s digital applied imaging division uses only a notebook computer, says Kodak spokesperson Joe Runde, who uses one of the IT department's approved models, a ThinkPad 560. "At some point, it becomes, 'Do I want to sync two systems up or do I just want to plug in a notebook?'" says Runde.

PeopleSoft Inc., by comparison,

"started off giving everybody a laptop" when it was founded 12 years ago, says Diane Wimmer, director of network services at the Pleasanton, Calif.-based vendor of enterprise software. Now, almost all the company's 6,000-plus worldwide employees rely exclusively on Toshiba notebooks (and a handful of second-sourced models), except for software developers, who also require powerful desktop systems.

The approved high-end notebook is the Tecra 8000, a system Toshiba aims at the corporate desktop-replacement market by minimizing design changes. Toshiba's Abate claims that this saves the average customer \$1,060 per seat per year. "They spend an inordinate amount of money on the qualification of a new notebook platform, and it usually takes a six- to eight-week period of time," Abate says.

Wimmer uses a 300-MHz Portégé 310 ultraportable with 128M bytes of RAM and 6G-byte hard drive; she regards this as a desktop replacement despite its external floppy and CD-ROM.

"We're pretty darn near a paperless company — everything is online," Wimmer says. Most people don't even use a port replicator, let alone docking stations or external drives. About half also use external monitors and keyboards.

To meet the special needs of such notebook-intensive sites, some PC vendors are responding with new programs and services (see "Reducing the Risks of Desktop Replacement," at left). Gateway, for example, planned to launch its Mobile Access service in mid-October. For \$199 to \$259 a year per system (depending on level of service) notebook users get around-the-clock phone support even for software that isn't unique to mobile computing, like Excel spreadsheets. A Mobile Access tool kit has a phone-line surge suppressor and software for backing up to an online service. An overnight repair service covers such details as delivering a preconfigured box to ship a notebook to a repair depot.

"We got the idea from focus groups," says Dan Ludwick, director of service development and marketing at Gateway's business division. "One-hundred percent said they could not tolerate 24 hours without their portable computer, and 71% said it would cause a significant productivity impact."

The demand shows every sign of continuing next year.

The promise of better power management in Intel's mobile CPUs and Microsoft's upcoming Windows 2000 operating system, growth in the use of wireless networks and continuing price and performance improvements in mobile technology all should extend notebooks' presence and importance within the enterprise. ■

Essex is a freelance writer in Antrim, N.H.

USER PROFILES

Continued from page 105

focus is to support people who're on the road 80% to 90% of the time."

Laptop: Dell Latitude CPi with a 366-MHz Pentium II

Who Chose: Dell is used throughout Chatsworth Products. "IT specifies what models are available, then the users choose" depending on their needs.

Why Chosen: It's a workhorse.

Comment: "A lot of people want light [notebooks], a lot of people want hot rods. With Dell, the light ones are the hot rods."

Gordon McCray

LAPTOP CATEGORY: CORPORATE STANDARD

Job: Professor of information systems, Wake Forest University, Winston-Salem, N.C.

Time Traveling: About three trips every two months



Laptop: IBM ThinkPad 390e with 128M bytes RAM, 6G-byte hard drive and a 14.1-in. screen

Who Chose: The CIO and information systems staff choose new systems every two years.

Why Chosen: "It offered the most performance for the money. We're pretty locked into how much money we can spend."

Comment: McCray also researches computerized learning and uses his ThinkPad to distribute multimedia learning materials and quizzes online and to stay in touch with students and faculty. "You can be in more frequent, richer contact with your students; there's this constant dialogue."

Dr. Clyde Wesp

LAPTOP CATEGORY: SUPERSLIM



Job: Pediatrician, Saddleback Memorial Medical Center, Laguna Hills, Calif.

Time Traveling: "Hard to assign a percentage. I use it when I need to grab some information between patients, that sort of thing. I also use it maybe an hour an evening at home."

Laptop: IBM 560

User Profiles, page 111

Reducing the Risks of Desktop Replacement

Major notebook vendors like Compaq, Dell, IBM and Toshiba have lately adopted new strategies to support customers who do most or all of their computing on a notebook. Among the services offered are the following:

- Beefing up service and support with walk-in or overnight repair service, special travel kits for road warriors, Web-based backup and broad technical support, even for standard office applications.

- Lengthening and simplifying product cycles to minimize the number of plat-

forms that customers must evaluate and support.

- Providing the same kinds of asset management and cost-of-using-a-computer support as for desktop PCs, such as bar coding of notebooks for asset tracking and software "images" that companies can use to propagate standardized, low-maintenance notebook configurations.

- Designing docking stations and port replicators so they can be used across a broader range of models over longer life cycles.

- David Essex

A Bumper Crop Of Notebook PCs

Thinking about a new laptop for yourself or the users you support? We look at many of the newest models in several categories to give you a starting point

MIGHTY MINI

IBM ThinkPad 240

CPU: 300-MHz Celeron
RAM: 64M bytes
HARD DISK: 6.4G bytes
CD, DVD: Optional external only
SCREEN: 10.4 in.
WEIGHT: 2.9 lb. (no CD)
PRICE: \$1,999
OVERALL GRADE: B-
PROS: Great keyboard for its size; overall good design
CONS: Screen is dimmer than most; CPU is less powerful

This, the smallest full-power computer IBM makes, is actually quite close in size and weight to its Windows CE cousin, the WorkPad Z50. But the 240 sports a bigger screen, more RAM, a hard drive and Windows 98, all making it a much more useful computer. As with other ThinkPads, you get the full set of Lotus Smart Suite Millennium edition. (By comparison, Compaq makes you choose (and buy separately) an office suite.

I've had great hope for this machine, ever since I first saw its predecessor at a corner at an IBM trade-show booth. During a recent press briefing, IBM even demonstrated that Windows 2000 will run on the diminutive 240 without a hitch. It's a machine with a lot of power in a very small package that somehow manages to look even smaller than it is.

Ergonomically, the ThinkPad 240 is a mixed bag. I was disappointed with the review unit's 10.4-in. screen, the dimmest of all the notebooks I tested. The thin film transistor (TFT) active-matrix display was certainly usable, but it was also harder on my eyes than

the other notebooks' screens, especially in a fully lit environment. Also, it looks as if IBM could have fit a larger screen, and that would certainly have helped. Conversely, the keyboard is the best I've encountered on a machine this size, and IBM's trackpoint implementation is my favorite nonmouse pointing device.

Being so small, the 240 offers no built-in removable storage. The add-on CD-ROM drive from IBM attaches through a PC Card, but when you first see it, the drive seems nearly as large as the ThinkPad. It also functions as a stand-alone CD player, and the built-in batteries (not needed



when connected to the computer) add considerable bulk and weight. There are other outboard CD drives on the market that are considerably smaller — and cheaper, too.

With its 300-MHz Celeron processor, this isn't the machine for heavy-duty calculations — but then you wouldn't normally pick a computer this small for such applications anyway, regardless of its CPU power. For normal office applications, used with an external monitor and keyboard, it's perfectly adequate, and when you travel — ah, then you'll appreciate its light weight and tiny footprint.

— Russell Kay

MIGHTY MINI, SLICER

Compaq Armada M300

CPU: 333-MHz Pentium II or Celeron
RAM: 64M bytes
HARD DISK: 6.4G bytes
CD, DVD: Optional in extension base
SCREEN: 11.3 in.
WEIGHT: 3.2 lb.; 5.1 lb. with base and CD
PRICE: \$2,399 (Pentium II); \$349 for base with CD
OVERALL GRADE: B+
PROS: Small, light package attaches solidly to base for a complete package; really portable
CONS: Keyboard too flat; screen smaller than it could be

Compaq Computer Corp.'s latest sidearm for the traveling computer user (I've promised never to write "road warrior" again) is a very neat machine. The main computer, minus all removable storage, is contained in a small package that's eminently usable. Plenty of CPU horsepower, memory and a good-size hard drive let you work anywhere. When you need removable storage, just clip the M300 onto its Mobile Expansion Unit base. It's simple, quick, makes a lot of sense and works great. Even with both floppy and CD drives installed, the total weight is barely more than 5 lb. Also, the CD-ROM bay can be used for other add-in devices, including an LS-120 SuperDisk, another hard disk or an additional battery.

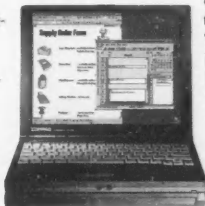
The devices that fit into the expansion base are also usable with other current Compaq Armadas, which can simplify life for the information technology manager who has to stock needed peripherals. There's no docking station per se for this notebook, but

there is a port replicator for simplifying desktop connections.

I found the keyboard big enough for my fingers, but the keys are too flat. Also, the display is sharp and bright (much better than the ThinkPad 240's), but I wish Compaq would have used a full 12.1-in. screen. It looks as if one could fit. There's a touch pad for cursor control; I'm not a fan of these, but this one worked well.

It's particularly interesting to compare this machine to Compaq's Aero 8000, a Jupiter-class Windows CE machine that's almost the same size. Though I was favorably impressed with the Aero [Technology, Sept. 13], put it side-by-side with the M300 and it's amazing how much the Aero gives up in memory, processing power and storage, while saving only an ounce or two. Yes, the M300 is twice the price, but it's 10 times the machine.

Because of the solid way the M300 attaches to its Mobile Expansion Unit base, and because of that base's ability to hold both floppy and optical drives simultaneously, this little wonder from Compaq is an excellent traveler. And with an external monitor and keyboard to shore up its weak points, it's a good desktop machine as well. If you're OK with the keyboard and screen, there's no better machine you can find without paying a big price in both dollars and size. — Russell Kay



Compaq Armada M300

You might worry that a computer this light could slide off your lap; Sharp has anticipated this with a suede leather pad covering half the bottom side. (I looked; there's no Gucci logo on it.)

And this package holds more little touches like that. Around the sides and back of this slim package are several patches of black rubber. Every port opening in the Actius, even the two USB ports, has a built-in, tethered rubber cover. There's a built-in 56K bit/sec. modem, a 10/100M bit/sec. Ethernet connection and special connectors for video and the unique outboard floppy drive. The only sour note in its exterior design is a rather flimsy-looking rigid plastic cover for the floppy drive cable. Why Sharp didn't use rubber here is a mystery; that little piece of plastic isn't likely to last long in the real world.

The ThinkPad 240, reviewed earlier, connects all its external appendages separately via individual cables, and its sides are festooned with connectors of all sorts, some standard and some proprietary. Sharp evidently decided this was an inefficient approach — something users of the Sony Vaio 505 notebooks might appreciate, given the plethora of attaching cables that ac-

company those machines. So Sharp's designers built most of the major external connectors — parallel, serial and mouse — not in the laptop itself but at the rear of the external floppy drive. If you want a CD, you'll still have to connect that separately, via the PC Card slot. On this design choice, I give Sharp an A for imagination and inventiveness and a C for common sense — if you want to use only an external mouse, for example, you still have to plug in the floppy drive. That floppy drive, by the way, has a permanently attached cable. The designers thoughtfully carved a channel in the bottom to store the cable when not in use, but it looks as if they ran out of time before they figured out what to do with the actual connector on the end, because it now dangles off the bottom, looking for a home. Compare this with the fixed cable on the Acer TravelMate's drive, which also has a built-in niche to plug the cable back in to the disk drive when it's not in use.

But let's face it: The Actius A280 isn't really meant as a workhorse for heavy use with external appendages. Instead, it's built like a racing greyhound, for lightest weight and maximum mobility. It has the largest screen of any 3-lb. computer, a full 12.1 in. of bright, clear 800-by-600-pixel LCD. That it's good shouldn't be surprising.

A Bumper Crop, page 112

USER PROFILES

Continued from page 109

Who Chose: IT department

Why Chosen: Not sure. "That's what I got. I know other doctors at Saddleback have different ones."

John Beavers

LAPTOP CATEGORY: SLICER

Job: Director, MIS, Novo Industries LLP, Houston (makers of mini-blinds)

Time Traveling: Only a few days per year, but he has the machine at home frequently.

Laptop: Compaq 1750 Armada, with docking station

Who Chose: Beavers picked it for his users and himself.

Why Chosen: Performance, price and reliability for his primary machine.

Comment: "If somebody told me to try a different machine, I'd say go pound sand. This machine is pretty mission-critical to me." Beavers said he has tried Toshiba and NEC laptops, but has had problems with displays giving out, processing delays and crashing.

Paul Herman

LAPTOP CATEGORY: SLICER

Job: CEO and acting chief technology officer, IcanBuy.com Inc., in San Francisco, an e-commerce site that lets kids use parent-funded debit accounts for online purchases.

Time Traveling: 20%; "We're able to do a lot of our work virtually," Herman says.

Laptop: Micron Technology Inc.'s GoBook2, purchased last fall

Who Chose: Herman and another senior manager make all the IT decisions for the 15-person company.

Why Chosen: Herman wanted the GoBook2's promised 8- to 11-hour battery life and was already a satisfied Micron customer.

Comment: "I use it at work and at home every day."

MIGHTY MINI

Sharp Actius Pro A280

CPU: 366-MHz Pentium II

RAM: 64M bytes

HARD DISK: 8G bytes

CD, DVD: External

SCREEN: 12.1 in.

WEIGHT: 2.7 lb.

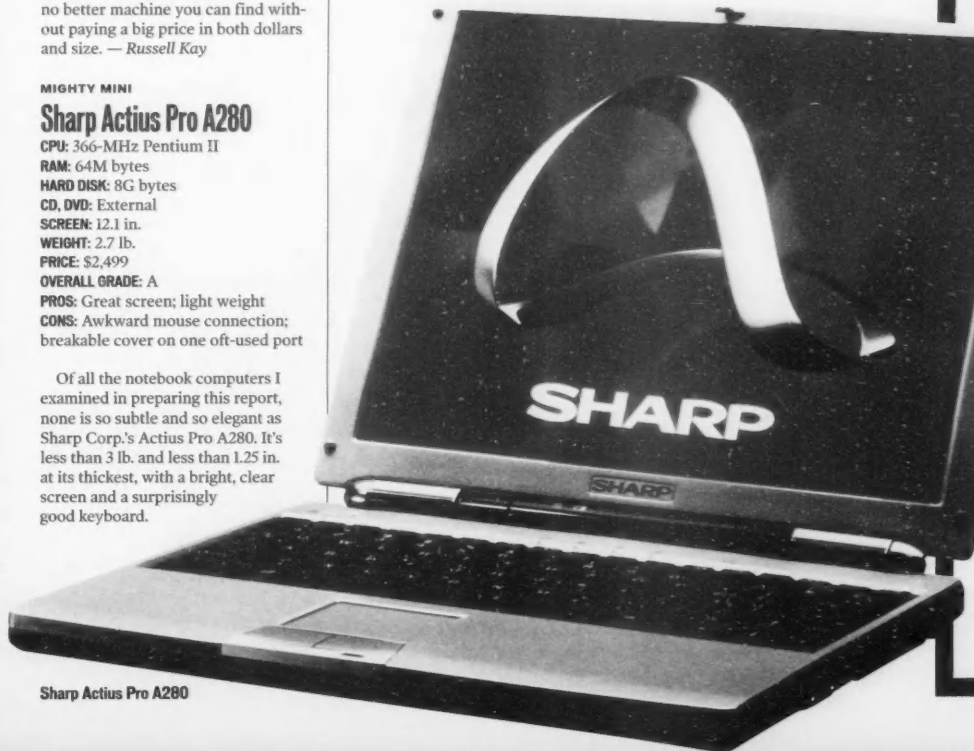
PRICE: \$2,499

OVERALL GRADE: A

PROS: Great screen; light weight

CONS: Awkward mouse connection; breakable cover on one oft-used port

Of all the notebook computers I examined in preparing this report, none is so subtle and so elegant as Sharp Corp.'s Actius Pro A280. It's less than 3 lb. and less than 1.25 in. at its thickest, with a bright, clear screen and a surprisingly good keyboard.



Sharp Actius Pro A280

A Bumper Crop Of Notebook PCs

Continued from page 111
because Sharp is a major supplier of LCD panels.

The keyboard is very good; it's different from that on the ThinkPad 240 but still has a decent key travel and typing feel.

So the A280 is easy to type on, look at and carry around. And yes, it's up to all the computing tasks you'd expect from its 366-MHz Pentium II and 64M bytes of RAM. At \$2,499, it's reasonably priced for what it delivers and for the overall design. If you can take just one computer with you to the board of director's meeting, this one will make you the envy of the crowd.

— Russell Kay

SUPERSLIM

Acer TravelMate 342T

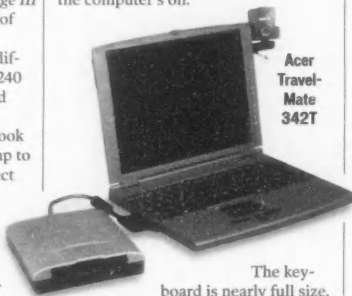
CPU: 500-MHz Pentium III
RAM: 64M bytes
HARD DISK: 9G bytes
CD, DVD: CD/floppy combo unit
SCREEN: 12.1 in.
WEIGHT: 4.1 lb.
PRICE: \$2,799
OVERALL GRADE: A-
PROS: Nicely integrated CD/floppy; easy-to-use videoconferencing
CONS: Only one PS/2 port; keyboard just so-so

Acer America Corp.'s new TravelMate 340 series notebooks are a wonderful compromise of light weight and supportability, ease of use and power. And its addition of mobile videoconferencing isn't bad, either.

The 4-lb., \$1,999 budget-version 340T offers many built-ins you won't find in most Superslims, such as integrated Ethernet and a full array of ports. It still offers plenty of value: a sharp 12.1-in. TFT display, a 450-MHz Pentium III CPU and a 6.4G-byte hard drive. I tested the loaded \$2,799 model 342T with the latest mobile 500-MHz Pentium III processor. The extra \$800 also gets you a 9G-byte hard drive and a nifty Universal Serial Bus (USB) video/still camera (with videoconferencing software) that attaches to the side of the screen.

Intel Corp.'s new mobile chips are smaller and less power-hungry, so laptops can show improved battery life for a change. The performance increase from the 300-MHz predecessor is noticeable, and I was routinely getting two to two and a half hours of battery life with most power-saving features turned off.

CD-ROM and floppy drives are still external, but Acer combines them into a single unit with an attached adapter cable, which lessens the chances of leaving any pieces behind in a hotel. You can plug the combo drive (either 24-speed CD or DVD) in or out while the computer's on.



Acer TravelMate 342T

The keyboard is nearly full size, offering pretty good feedback. Still, if you've got big hands, I'd recommend an external keyboard. However, like most lightweight notebooks, the TravelMate has but one port for a keyboard or mouse. I plugged the keyboard into the PS/2 port and used a USB mouse to alleviate the problem. This works well most of the time, but keep in mind that USB mice aren't supported by Windows 9x's "safe mode" recovery tool. So when Windows 9x crashes, remember to unplug the mouse and switch to the built-in Synaptics touch pad to navigate through safe mode.

Acer is doing well at correcting design glitches, such as building in Ethernet and moving the AC socket, which in the predecessor 332T interfered with the modem. Although Texas Instruments Inc. actually started the TravelMate series, the current designs are entirely by Acer. And given the usability of the 342T, I'd say they got it right. — Cynthia Morgan

SUPERSLIM

Compaq Armada M700

CPU: 366-MHz Pentium II
RAM: 64M bytes
HARD DISK: 6.4G bytes
CD, DVD: CD
SCREEN: 14.1 in.
WEIGHT: 5.7 lb.
PRICE: \$3,399
OVERALL GRADE: B+

Compaq ProSignia 170

CPU: 400-MHz Pentium II
RAM: 32M bytes
HARD DISK: 4G bytes
CD, DVD: CD
SCREEN: 14.1 in.
WEIGHT: 4.8 lb.
PRICE: \$2,699 (estimated)
OVERALL GRADE: B+

A Bumper Crop, page 114

Commentary: (Liquid) Crystal Gazing

If we compare today's mainstream notebook computers with those of, say, four years ago, the changes have been major. Today's laptops are thinner, lighter and more powerful, with bigger screens and a wider-than-ever range of storage and communications options. Oh — and they're also cheaper.

But what about the future? For those few IT managers, fresh from their year 2000 ministrations, who might now have a moment to think about what computers they will be buying down the road, I offer a few predictions and speculations on future notebooks, all based on ideas I've heard discussed by research and development engineers and on hints dropped by product managers.

I believe the market will go in three different directions. Recall that the greatest activity today is with the smaller laptop computers — what I call the Tiny-9x and Mighty Mini categories — while at the same time there are more and more laptops with 15-in. screens. Thus we're going to see activity at the extremes of the size range.

The Big Get Bigger . . .

Let's consider the big guns first. Desktop LCD flat-panel monitors are now available in 18- and 20-in. sizes, albeit with \$3,000-plus price tags. Thus it's almost inevitable that some crazy vendor will try to build a transportable computer (I couldn't exactly call it a notebook, could I?) based on one of these. On the face of it, the idea seems laughable. Such a computer would be as big as an attaché case. (Of course, there'd be plenty of room for a full-size keyboard and as many drive bays and connectors as you'd like!) But as the price of the larger monitors drop, aided by increased flat-panel production for television use, someone will test those waters. Why? To quote Mount Everest mountaineer George Mallory, "Because it is there."

This computer would be an impressive, even mind-boggling machine for video and PowerPoint presentations. But it would be simply too over-the-top and unwieldy to be useful otherwise. In the end, such a computer is almost certain to remain a niche product — if it remains on the market at all.

And the Small Get Smaller . . . Sort Of

We already know how small computers can get, right down to palm-size personal digital assistant (PDA) handheld PCs. Obviously, they could get even smaller if there were any point to making them so or if they were useful at a small size.

But one inescapable problem is that our hands won't get any smaller to type on miniature keyboards. The smallest keyboard in use today is on the Blackberry Interactive Pager from Research In Motion Ltd. It works surprisingly well for occasional use.

The original Toshiba America Information Systems Inc. Libretto severely pushed the lower limits of size in anything we could call a notebook computer. And that size is simultaneously its biggest advantage and biggest problem. A small person with slender fingers

and tiny hands can, maybe, just barely touch-type on the Libretto; most users have no choice but to use the hunt-and-peck method.

IBM tackled the keyboard problem a few years ago with its Butterfly ThinkPad that cleverly rearranged itself as you opened the lid until the keyboard grew to 2 in. wider than the case underneath. That worked well and could have been developed further to an even smaller closed size. But the idea was shelved as screens got bigger and makers no longer had to resort to mechanical tricks.

What about nonkeyboard input? Some pundits predict that speech recognition will become a major input vehicle within a few years, but I doubt it. While that technology is pretty good and getting better, neither it nor our office layouts and desks were designed to accommodate an environment in which everyone is talking at once.

Handwriting isn't an answer either; have you ever tried to compose a long document on your Palm PDA by writing in Graffiti? It's not fun, and it's not fast. No, real keyboards will be around for some time to come.

The other human limitation is our eyesight. The smaller the screen, the less useful information it can display. Is there any way to package a big screen in a tiny package? I'm not talking magnifying lenses or virtual-reality style goggles but the actual screen itself. Going a bit further out on a limb, I predict that within three years someone will demonstrate a practical, notebook-like screen that can unfold from a compact, closed position to a significantly larger size.

And there are other possibilities, including perhaps, holographic projection.

Meanwhile, Back in the Middle

The 12- to 14-in. screen laptops that make up the bulk of today's best-sellers are likely to remain the normal configurations that are used by most workers. They are, after all, big enough, and they will get cheaper. Today's office-grade notebooks, based on the units I've reviewed, cost on average close to \$3,000 per machine, and that doesn't count extras. Computerworld's new Dell Latitude computers, complete with docking station, second battery and carrying case, carry a total retail price tag of \$4,800. And even though purchase price is only one part of the total cost of ownership, it's still a significant chunk.

Lower Costs

Desktop computers have dropped in price at a dizzying pace; you can find new, sub-\$500 machines almost anywhere. Laptops haven't fallen nearly so far, but there's now a considerable choice for less than \$2,000. Two years ago, the cheapest laptops were older designs reflecting bloated inventories. Now, the cheapest are more likely to reflect leading-edge technology that offers savings in the cost of components and manufacturing, as well as in size and weight. Tomorrow's laptops will be cheaper, for sure. But don't wait; there's no better time than the present for getting a new notebook. — Russell Kay

REVIEWER ANALYSIS



Was it fear that drove 9 of the top 10 Internet companies to Network Appliance?

Call it fear. Call it prudence. Or just call it common sense.

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A Bumper Crop Of Notebook PCs

Continued from page 112

PROS: Share docking stations with other Compaq notebooks; highly expandable
CONS: Flat keyboards could be better; flaky lid latch



Compaq
Armada
M700

For this report, we requested and received two Superslim Compaq notebooks, one each from the company's Prosignia (aimed at the small-office, home-office market) and Armada (enterprise-aimed) lines. The two appeared in most respects to be clones of each other, differing only in the color of the lid and the model name thereon, but in fact they're different machines underneath the skin. Still, the commonality of case size and layout means both can use the same docking stations and many of the same accessory peripherals, including Compaq's unique "tower" configuration for docking. It also helps keep costs down.

A good corporate citizen, the M700 comes standard with V.90 modem and 10/100 Ethernet ports, while the Prosignia's network card is optional. Both notebooks are available in many seemingly identical configurations of processor speed, screen size, memory and storage, but there are some basic differences. For example, the Armada's memory is expandable up to 576M bytes of RAM, while the Prosignia tops out at a "mere" 288.

Both have Compaq's typical fairly flat keyboards that are large and usable, but not to my taste. I'd want to hook up an external keyboard first chance I got. However, as with most modern notebooks, only one PS/2 port is provided, so you'd then need to use either a serial or USB mouse. Also, there's just a single USB port, even though there seems to be plenty of room to fit another. The review machine came with a trackpoint and three buttons, but it's also available with a touch pad for those who prefer it. This is the kind of ergonomic, personal-preference option I believe more computers should offer, because users tend to like one system and hate the other—except for those who hate them both.

The Armada has both an inconspicuous black power-slide switch and a prominent blue suspend button. This was quite confusing, because they are identified on the machine itself with only similar-looking icons that don't tell you much. I discovered my basic assumption was wrong only after reading the manual. And in truth, although there's no substitute for a good manual, expecting users to read it beforehand seems largely a lost cause.

The display is quite good, though it seemed subjectively (I couldn't measure this) just a bit dimmer than the Dell Latitude CPi's 14-in. screen. The built-in DVD drive is on the right side of the case, and there are front-mounted sockets for headphone and microphone jacks. There's no hardware volume control, which I would have appreciated. When closing the case, one of the two latches sometimes failed to engage, even when I was careful.

In use, both Compaqs performed well. Indeed, without resorting to benchmarks for determining processing speed and power differences, there are no real differences noticeable to the user. All the machines we tested for this special report were faster than any normal user is likely to need—and almost certainly faster than whatever computers they are replacing in the enterprise.



Compaq
Prosignia
170

There seems a bigger disparity in prices between the Prosignia and the Armada than their construction and design would warrant for such basically similar machines. However, final pricing on the Prosignia line wasn't available at press time, and it's likely that, in the end, they won't be that far apart for similar configurations. Also, there's a fundamental difference in the software that comes with the machine. The Armada comes with Windows 98 and Compaq's management utilities. The Prosignia has that plus Microsoft Office Small Business Edition and other application software.

So if you opt for Compaq, you can pay a bit extra for the more stable, expandable Armada platform, or save a few bucks with the silvery Prosignia version of this midline Superslim notebook. Either way, you're getting a good, solid workhorse of a machine.

—Russell Kay

CORPORATE STANDARD

Dell Latitude CPi R400

CPU: 400-MHz Pentium II
RAM: 128M bytes
HARD DISK: 6.4G bytes
CD, DVD: CD
SCREEN: 14.1 in.
WEIGHT: 6.7 lb.
PRICE: \$2,898
OVERALL GRADE: A-
PROS: Big, bright screen; good battery life
CONS: Two-spindle design; lacks built-in modem and network interface card

Computerworld is replacing its editors' and reporters' laptops with this new 400-MHz, 14-in. notebook. As a result, this review is necessarily tougher than many others simply because I use this machine every day and rely on it for my work.

Dell calls the Latitude CPi a 5-lb. machine, but that's true only if you take out the battery and CD-ROM drive. The Latitude seems well-built and rugged, but it offers fewer features than many competitors. There's no built-in modem or network adapter, for example. Also, because of the Latitude's two-spindle design, the floppy drive normally connects via cable to the parallel port. That's fine for a stand-alone machine, but on a docking station with CRT monitor, it's very awkward to attach and disconnect. The dock itself is nicely done; it's easy to attach and detach the computer, and alignment is automatic.

Cursor movement is via a built-in touch pad; a slightly newer model, the just-announced Pentium III Latitude CPiX, will offer that plus a trackpoint (my own preference). Retrofits aren't possible. I've easily gotten nearly three hours use from the lithium ion battery when most of the power-management features were turned off.

The keyboard is full size, with nicely sculpted keys and a good typing feel. But I have to wonder why Dell chose to stick the too-small Home, End Insert, Delete, Page Up and Page Down keys away in the corner, where you really have to look to use them. I've taken to putting colored masking tape on the delete key so I can find it without reading the key-top labels.

In a similar vein, the CD-ROM drive sits in its forward-facing bay with front plate angled down, in shadow. I have to hunt to find the gray-on-gray eject button. With a similar bay, the IBM ThinkPad 600E uses a bright blue button that stands out.

The display is sharp, clear and evenly lit. Two years ago, I thought a 14-in. laptop screen was extravagant. Now that I'm using one regularly, I'm a believer. Even though I use a docking station with an external keyboard and monitor at my office, there's no ques-

One User's Picks

While preparing this special report over the past two months, I've had the good fortune to use many different laptops—all those reviewed here and more. And after all that, which do you suppose is my personal favorite, the one I'd most like to use?

Three or four months ago, I'd have answered that question automatically: the now-discontinued Gateway Solo 3150XL FireAnt [Technology, April 19]. In every respect except screen size, the FireAnt was the equal of my new Computerworld-issue Dell Latitude CPi. Its built-in modem and network interface card meant fewer bits and pieces to keep track of, and it was smaller and lighter than the Dell.

Of the current machines, I'm honestly torn between some great examples of two categories of notebooks. On the one hand, I really like the extreme portability of the bigger-screen Mighty Mini machines like the Sharp Actius and the Acer TravelMate. Their 3 lb. are so easy to carry, and until you need a removable drive, they're just about perfect. And I salute the Compaq Armada M300, whose designers did a great job of packaging its disk drives. I only wish its keyboard were less flat (ditto for the Sharp), and its screen a tad larger. I'd pick any of these for use away from home base.

However, I'm also very attracted to the bigger and heavier ThinkPad 600E as well as the ThinkPad 570 with its add-on base. And I'm getting to like my Dell Latitude CPi very much. The bigger screens and much better keyboards of these models make for great all-around usability, at a slight sacrifice in size and weight.

Price matters, too. If I were buying one with my own money, I'd be strongly tempted by the Acer TravelMate 340, a terrific value at \$1,999. Were I filling out a company purchase order, however, I'd opt for the IBM ThinkPad 600E, which for nearly twice the cost offers a nicer, bigger screen and keyboard and has a built-in CD drive. —Russell Kay

tion that the 1,024-by-768-pixel screen, at normal working distance, is easily the equal of any 17-in. CRT. Thus, for many users, this notebook won't require an external monitor, and this aids the cost justification.

In case you've gotten the impression I don't like the Latitude, let me offer an analogy. I feel like I'm married to this particular machine; we're paired up in a long-term relationship, and I'm by now fully aware of its flaws based on intimate familiarity and direct experience. It was an arranged marriage—I didn't get a choice—but that's OK because it's working. Yes, there are more attractive, useful, powerful, lighter (take your pick) notebooks that I might have preferred, but this Latitude is just fine. I have no regrets and would recommend it to anyone.

—Russell Kay

A Bumper Crop, page 116



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A Bumper Crop Of Notebook PCs

Continued from page 114

CORPORATE STANDARD

IBM ThinkPad 600E

CPU: 400-MHz Pentium II

RAM: 64 M bytes

HARD DISK: 10 G bytes

CD, DVD: CD

SCREEN: 13.3 in.

WEIGHT: 5 lb.

PRICE: \$3,787

OVERALL GRADE: A

PROS: Great keyboard, screen, track-

point; excellent packaging; light weight

CONS: Two-spindle design; model

longevity uncertain



IBM ThinkPad 600E

The ThinkPad 600E is one of IBM's best-selling models, and I'm not the least bit surprised by that. For a two-spindle machine, this is about as good as it gets, combining a good keyboard, well-done pointing device and a great display into the smallest possible case that will contain them. In fact, using the ThinkPad 600E makes me think someone at IBM took my previously favorite laptop, Gateway's Solo 3150XL FireAnt, upsized it by 10% and then painted it black. That may seem like a backhanded compliment, but in truth this is a really great machine.

The 600E exemplifies all the things IBM does well in laptops: a great keyboard, a large but tightly packaged screen, excellent quality cables and peripherals, and the best trackpoint of any notebook. Compared with the ThinkPad 570, it's quite slim (thinner than the 570; thinner than the 570 plus base) and light. Also, while many laptops charge extra for application packages, such as Microsoft Office, ThinkPads include the full-boat Lotus Smart Suite, Millennium Edition.

However, the particular 600E we tested was a little out of the ordinary, because it came with Windows 2000 Professional (Release Candidate 2) preinstalled and 128M bytes of RAM to run it with. And it performed just fine in our use. Again,

this is no surprise because IBM has been working with Microsoft to ensure good performance on all its machines, and IBM has made a major commitment to supporting Windows 2000 for its customers.

Choosing a 13.3-in. display helps keep the 600's girth and weight down; it's just more than 5 lb.

We've classified the ThinkPad 600E as a Corporate Standard because of its productive character and the fact that it's been around longer than many other notebooks. However, that also means its future may be uncertain.

Nice as it is, it will likely be replaced with a Pentium III model, and if I had to take bets, I'd guess IBM will also bump the screen size up to 14.1 or even 15 in. Nothing wrong with that, but it will mean more weight, more bulk and a little less portability.

But that's speculation; the ThinkPad 600E is a great machine. Just don't wait too long to get yours. — Russell Kay

DESKTOP DO-ALL

Gateway Solo 9300XL

CPU: 500-MHz Pentium III

RAM: 128M bytes

HARD DISK: 12G bytes

CD, DVD: Four-speed DVD

SCREEN: 15 in.

WEIGHT: 7.8 lb.

PRICE: \$3,799

OVERALL GRADE: B+

PROS: Fast and powerful; big screen

CONS: Heavy; large housing

A few years ago, the only notebooks that were really viable as desktop replacements were top-of-the-line, 9-lb., \$5,000 behemoths. But notebook vendors have introduced newer, lighter, less-expensive notebooks that still give all the necessary speed, screen quality and storage options. Enter Gateway Inc.'s new Solo 9300XL.

The 9300XL jacks up performance with Intel's new Mobile Pentium III chip. I didn't run formal benchmarks, but the 9300XL loaded Windows and screamed through Office 97 much faster than my 266-MHz Pentium II-based Compaq Armada with 64M bytes of RAM.

Gateway claims a battery life of 4.7 hours (6.5 hours with two batteries). I got a much lower but still respectable 3.6 hours in my informal test of the single-battery configuration.

The 9300XL's 15-in. screen didn't seem to give away any brightness or sharpness compared with smaller screens. (You can also get a 14.1-in. screen on the lower-priced 9300 models.)



Gateway Solo 9300XL

My \$3,799 preproduction unit also came loaded with graphics and storage, including 128M bytes of synchronous dynamic RAM, a 12G-byte hard drive and a four-speed DVD. The 2X Accelerated Graphics Port bus, plus the 8M-byte ATI video card, should make the 9300 a decent platform for running 3-D games and full-motion video. Also included: an internal V.90 56K modem and a 10/100 Ethernet port.

The 9300XL offers two option bays. One takes a CD-ROM or CD-rewritable drive in place of the DVD; the other accepts a standard floppy drive, hard drive, LS-120 Superdisk/floppy drive or second battery. At 1.6 in. thick, this may be the thinnest three-spindle notebook around, but its weight of 7.76 lb. means you're not likely to race through airports with it.

I found the 9300XL easy to use, with a solid, rugged feel and decent ergonomics. Its shallow, comfortable keyboard has a broad wrist rest and touch pad for cursor control; you can also get it with the IBM-like EZPoint. DVD/CD audio playback buttons are conveniently located on the front.

You can get a less-loaded 9300 for as little as \$2,299. That kind of pricing makes this an attractive machine for IT to use as a desktop replacement, provided it can live with the machine's likely shorter life cycle. — David Essex

Essex is a freelance writer in Antrim, N.H.

DESKTOP DO-ALL

Apple PowerBook G3 400

CPU: 400 MHz, G3 PowerPC

RAM: 192M bytes

HARD DISK: 6G bytes

CD, DVD: DVD

SCREEN: 14.1 in.

WEIGHT: 5.9 lb.

PRICE: \$3,899

OVERALL GRADE: A-

PROS: Fast processor; many ports and connectors; built-in MPEG-2 decoding

CONS: Incompatible with

some fax software; can't take Type III PC cards

This Apple Computer Inc. system has a 400-MHz PowerPC 750 (G3) processor, 1M byte of cache RAM, 192M bytes of RAM, a 6G-byte hard drive and a DVD drive. An ATI graphics controller with 8M bytes of video memory drives the clear 14.1-in., 1,024-by-768-pixel active matrix display and can show full-screen 3-D graphics using millions of colors. The big display provides ample real estate for parking many application windows.

One of the two hot-swappable bays normally holds a battery. A DVD drive in the other lets you see a movie on the PowerBook or pipe it to a TV. Or batteries in both bays will double your working time. Apple claims up to five hours of battery life.

Thinner and nearly 2 lb. lighter than its predecessor, the svelte new profile means just one CardBus slot and precludes using older expansion modules.

This PowerBook is an exceptionally well-connected computer, with a full range of ports that let you hook up practically any peripheral: An RJ-45 connector for 10BaseT or 100BaseTX Ethernet links (autosensing the speed); an internal 56K bit/sec. modem; an HDI-30 SCSI connector; two USB ports; a 15-pin VGA port for an external monitor; a fast-infrared port; and S-video output.

The one software incompatibility I discovered is with Global Village's GlobalFax software. It sends faxes just fine from the PowerBook, but it can't receive them automatically; you have to force the software into a manual receive mode.

All the applications and utilities I tried ran briskly under Mac OS 8.6, which itself showed excellent stability; on one occasion I didn't experience a crash for several days.

If you're on the road a lot and need desktop processing power in a portable package,

this PowerBook's for you. — Tom Thompson

Thompson is a senior training specialist at Metrowerks and was formerly an editor at Byte Magazine.

MOREONLINE

Many of the notebook reviews in this issue are expanded in the online edition, where you can find reviews not included here. The configuration listed is what was reviewed, though in most cases other options are available that will affect price and performance.

www.computerworld.com/more



Apple PowerBook G3 400

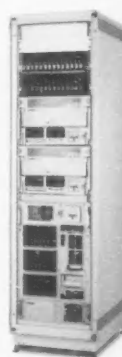


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Internet Explosion

BY LESLIE GOFF

IN 1994, at the ripe old age of 4, the Web suddenly spawned the four companies that would shape its destiny for the remainder of the decade: Amazon.com Inc., RealNetworks Inc., Yahoo Inc. and — perhaps most important — Netscape Communications Corp. Collectively, these companies would end up defining the categories that would lead the Web gold rush.

And it all happened before Microsoft Corp. had even begun to assess its own Internet strategy, writes Netscape co-founder Jim Clark in his book *Netscape Time: The Making of the Billion-Dollar Start-Up That Took on Microsoft*.

In January 1994, Clark was packing up the accumulations of 12 years at Mountain View, Calif.-based Silicon Graphics Inc., the workstation vendor he founded in 1982. Having been pushed out of the company, he was both bitter and eager to prove himself again and was scouting for potential partners.

An SGI colleague, Bill Foss, suggested that Clark talk with Marc Andreessen, who had just come to Silicon Valley from the University of Illinois at Urbana-Champaign. Clark had never heard of Andreessen or the popular Web browser Mosaic, which Andreessen had co-developed while working at the university's National Center for Supercomputing Applications (NCSA).

In Clark's first foray onto the Web, using a copy of Mosaic that Foss downloaded for him, Clark found Andreessen's home page and e-mailed him. A few days later, they met at one of Palo Alto, Calif.'s deal-making hot spots, Cafe Verona, where "on any given day ...



Well, we could always build a Mosaic killer.

MARC ANDREESSEN,
CO-FOUNDER, NETSCAPE

conversations are going on that can create companies or bring them down, give birth to amazing technologies or major flops," Clark writes.

Both men were "disenfranchised entrepreneurs," with Clark squeezed out of SGI and Andreessen squeezed out of the NCSA's venture to commercialize Mosaic. "I liked Marc intuitively and sensed that he was the kind of person needed for another start-up," Clark writes. "Marc had only one condition, not about what we ought to do, but what he

adamantly didn't want to do: 'I'm finished with all that Mosaic s---.'"

By mid-March, Clark and Andreessen had developed a business and technology plan for a company that would bring Nintendo games online. As fate would have it, that plan never took off. Two weeks after a lackluster meeting at Nintendo of America Inc., the two men still found

themselves with the drive to create something new but had no idea what it should be.

That was when Andreessen reversed himself. Over a second bottle of burgundy in the wee hours of a Thursday night, he told Clark, "Well, we could always build a Mosaic killer."

They chose the ill-fated name Mosaic Communications Corp. (the company changed the name in November to avoid conflict with the NCSA), and Clark incorporated the company on April 4. They recruited most of the programmers that Andreessen had worked with at the NCSA and set up shop in Mountain View, Calif.

Clark writes: "In almost all of the cubicles, sleeping bags and pillows or beat-up couches offered evidence of life and work inextricably mixed, of catnaps grabbed during three- and four-day stints of code writing."

By October, after only six months of development, Netscape had posted a beta version of Navigator on the Net, and by the spring of 1995, Web users had downloaded more than 6 million copies.

In the meantime, other brainstormers were raging that would complete the foundation that would support the

growth of the Web.

Stanford graduate students Jerry Yang and David Filo were developing the database that would become Yahoo; Jeff Bezos, a hedge fund manager, was concocting online bookstore Amazon.com, setting the standard for e-commerce; and Rob Glaser, a former Microsoft product manager who was interested in convergence, was busy establishing

streaming media giant RealNetworks (then known as Progressive Networks Inc.). The browser, the search engine, the electronic retailer and the media player helped take the Web from the academic outback to the forefront of popular consciousness. Netscape, which had possibly the most dramatic rise of them all, has had perhaps the most ironic destiny. Last November it merged with onetime competitor America Online Inc. in an alliance with Clark's onetime workstation nemesis, Sun Microsystems Inc.

Clark and Andreessen still maintain ties with Netscape, but each has gone on to new Web ventures. "Despite the craziness, or perhaps because of it, we had accomplished a tremendous amount in very little time," Clark writes. "We had set a new standard for American industry. This defined the idea of 'Netscape time,' which also became known as 'Internet time.'"

Goff is a freelance writer in New York. Contact her at goff@ix.netcom.com.

1994

Technology Happenings

- **The Internet community** celebrates the network's 25th anniversary.
- **Apple Computer Inc.** debuts the PowerMac family, the first Macintoshes to be based on the PowerPC chip, an extremely fast processor Apple co-developed with IBM and Motorola Inc.
- **Cisco Systems Inc.** adds Newport Systems Solutions, Kalpana Inc. and LightStream Corp. to its fold.
- **James Gosling** and **Bill Joy** begin transforming **Sun Microsystems Inc.**'s Oak programming language, developed in 1991 for interactive television applications, into what becomes Java.
- **Louis Rossetto** launches **HotWired**, the first Web site with original content and Fortune 500 ads.
- **Steven Kirsch** (at right) starts up **InfoSeek**, an Internet search engine.
- **Fortune** magazine declares **PeopleSoft Inc.** the fastest-growing software company in America.
- **Hewlett-Packard Co.** debuts the Color LaserJet printer, the OfficeJet printer, fax and copier, and the HP 200LX palmtop PC with **Intuit Inc.**'s mobile financial-tracking application Pocket Quicken built in.
- **Microsoft Corp.** and **Intuit**, maker of **Quicken**, announce a merger, creating monopoly concerns in the industry.
- On Sept. 8, some 11 months before it will be available, **Microsoft** officially announces **Windows 95**, previously code-named Chicago.
- **Iomega Corp.** introduces its Zip drive and Zip disks in 25M- and 100M-byte capacities.
- The Web edges out **Telnet** to become the second most popular service on the Net.



Other Notables

- **Best Picture:** *Forrest Gump*
- Major league baseball players go on strike, and the **World Series** is canceled.
- **Newt Gingrich** is named House Speaker.
- Grunge rocker **Kurt Cobain** commits suicide.
- Flashback is produced with the assistance of The Computer Museum History Center in Mountain View, Calif.



CIA official Aldrich Ames is charged with spying for the Soviets.

Thousands are killed in the Rwanda massacre.

Israel and Jordan sign peace treaty.

A major earthquake jolts Los Angeles, killing 51.

Bill Clinton is accused of sexual harassment while governor of Arkansas.

O. J. Simpson is arrested and charged with killing his wife, Nicole Brown Simpson, and her friend, Ronald Goldman.

IT's New Ambassadors

While this new IT role is just starting to take hold, its need to master multitasking, negotiation and diplomacy could put you on the fast track to top management
By Emily Leinfuss

Who: Douglas Bleyaert

Company: La-Z-Boy Inc., Monroe, Mich.

Title: Director of asset management since August 1997

Previous title: Manager of PC support

Reports to: CIO, who reports to the chief financial officer

Skills for job: Bleyaert says an effective asset manager is a master multitasker who has the ability to balance the many aspects of the job. Each day, Bleyaert usually handles all of the following areas:

- **Financial** - making the right decisions in purchasing equipment
- **Contractual** - making sure equipment is covered and documented
- **Technical** - adhering to information technology standards and configurations
- **Timing** - everything happens very fast. You have to make quick decisions

Temperament: In addition to juggling all of the above, an asset manager needs to be part diplomat and part communicator — able to make decisions on the fly and keep people informed, says Bleyaert. "A division head came up to me with a project under time constraint and wanted a particular piece of equipment that wasn't standard. They had a good business reason for it, so I gave them the OK," he says.

Biggest Challenges: The speed of technology changes. "In one day there are so many new things to keep up with. Once,

we were buying the same computer, same model, but when it came in, it had a different processor. So even if you standardize on a certain PC or processor, it can change every six to nine months. You have to change your configurations to keep up with tracking, to keep the network up-to-date on those changes and make sure remote locations know what to do if there is a problem," Bleyaert says.

Stiff Competition: On any given day, one supplier of software or hardware can undercut any price. "We try to limit the num-

ber of suppliers that we deal with, but we still have a lot of administration to keep the system accurate and up to date," Bleyaert says.

Assimilating Acquisitions: Acquisitions and mergers cause obstacles — especially on a cultural level. "It is challenging to manage the different processes companies use to procure and track assets," he explains. "We recently acquired a company that had their own equipment that didn't completely match our standard, and now there is a whole new group of items to keep track of remotely."

Biggest Break: The software tools that track and assist asset management are getting better, as is the recognition of the value of total-cost-of-ownership information.

Outlook for Career: Bleyaert says asset management will grow and move out from under IT and into the corporate mainstream. He says management will soon realize the value of the information to make intelligent decisions and how that impacts the bottom line. He also believes the discipline will move into project accounting, "where you will get into tracking what a project costs to do and implement," he says. He recommends joining professional associations like the Information Systems Financial Management Association. ▀

Leinfuss is a freelance writer in Sarasota, Fla.

Just the Facts

The job of asset management is a series of parts. Part information technology, part procurement, part contractor and negotiator and part traffic cop.

But as the demand for the kind of total-cost-of-ownership data that the job provides increases — and it is significantly, according to Pat Cicala, vice president of IT asset management procurement solutions at Gartner Group Inc. in Stamford, Conn. — those parts merge into a major career path toward high-level management.

Driving forces: There are three forces driving the advent of asset management. Kathy Shoop, vice president at Janus Technologies Inc., an asset-management software development firm in Pittsburgh, defines them as the proactive management of all IT assets, including hardware, software and telecommunications:

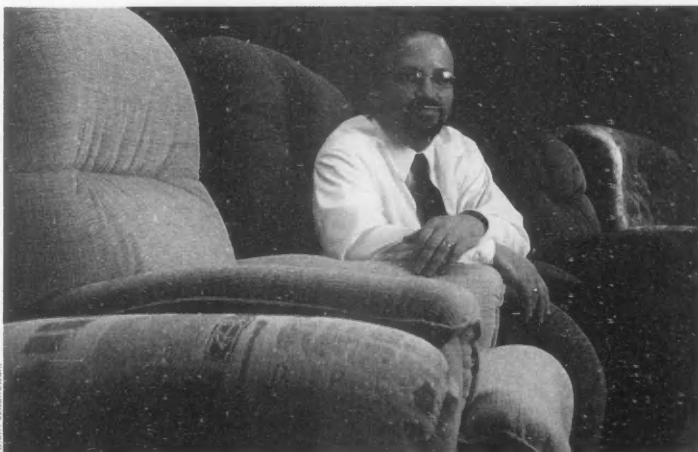
- **Hardware** is becoming a commodity.
- **Companies** are continually buying bigger, faster software.
- **Businesses** are looking for return on investment and total-cost-of-ownership information.

"Companies want to know how much they are investing and what the payback is. They aren't willing to install things just on the belief that it will make them more competitive," says Shoop.

Career potential: All this is making asset management a growth career. "It is amazing how many jobs there are out there, even though they are sometimes identified as positions like chief financial officer or assistant supervisor for accounts," says Glenn McLeod, manager of the logistic support group at the Communications Research Centre in Ottawa, part of Industry Canada, a federal government department.

Salary ranges: Industry experts say compensation for asset managers can vary depending on what area the department is in and how it was formed. But generally, salaries at the director level range from \$60,000 to \$80,000. For the assistant manager level, salaries are approximately \$40,000.

— Emily Leinfuss



DOUGLAS BLEYAERT, director of asset management at La-Z-Boy Inc., says asset managers should be flexible

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SOFTWARE ENGINEER (Greenville, SC). Provide on-site consultancy in systems development & integration in mainframe & client/server application on UNIX, MVS/VM, Windows NT, Windows 95, Office 98, analysis, design, develop, test & implement object oriented & structured applications using COBOL, COBOL-II, COBOL-III, DB2, CICS, JCL, SPUR, QMF, C, Pre-CIS, SQL, PL/SQL, REXX, Easytrieve, Oracle, Developer 2000, including Forms, Reports & Graphics, Sysbase, Visual Basic, Crystal Reports, MS Access, CYBORG, COGNOS, SQL Loader, SQL PL-SQL, Relational Modeling and Data Analysis. CTRLD, TRJ, JMicrofocus Animator, design conversion tools & job streams from COBOL to various client applications; performance tuning of developed systems; write shell scripts on UNIX to run batch applications. Req's: BS (or equivalent) in Computer Science/Electrical Engineering or related engineering & 5 yrs exp in the job offered or as Jr Manager (MIS). 50% travel to customer sites within the US required. 40 hrs/wk, 8:00am-5:00pm, M-F. \$67,000/yr. Mail 2 resumes to: Ms. Regina D. Ratterree, EAST Technical Services, SCESC-SC20009874, P.O. Box 1406, Columbia, SC 29202.

Senior Computer Science Engineer (multiple openings). Requires a Master's degree in level coordination & testing, application debugging & customer support. 40 hrs/wk; 8a.m. - 5p.m. Salary: \$63,000/yr. Req: M.A. or Bach. 5 yrs. exp. as a Software Eng. to evidence advanced knowledge of SQL, PL/SQL and PowerBuilder, UNIX, C++, Oracle & Visual Basic. Foreign degree may be considered equiv. to U.S. degree. Bonuses or other compensation incentives may be available. Direct resumes to Alaska Department of Labor, AL/CASE #1390, P.O. Box 25508, Juneau, AK 99802-5509. Fax: 907-465-5558. EOE.

PROGRAMMER ANALYST B-Responsibilities include performing technical tasks efficiently and effectively providing a high quality product; preparing detailed specifications from which programs can be written; performing problem determination/analysis; developing technical specifications in accordance with functional specifications; assisting in establishing file requirements and processing routines; developing and maintaining code for programs; preparing test data and validating software for the accuracy against specifications. Will work 40 hours/wk., 8:00-5:00 M-F and the salary will be \$42,800/yr. Req: Bach or equiv in CompSci, Engin or Math. Reply with resumes and Social Security Numbers to: Indiana Department of Workforce Development, 10 N. Senate Ave., Indianapolis, IN 46204-2277. Attention: Mr. Gene R. Repligle, I.D. #6061643.

Senior Software Engineer: Location: Myrtle Beach, South Carolina. 1. Designs, codes, develops and tests computer software systems utilizing Software AG's ADABAS/Natural applications; 2. Designs and tests mainframe software systems utilizing Knowledgeware's Design Workbench product and application prototype that uses Software AG's Natural application development product; 3. Maintains, evaluates, and tests using ADABAS/Natural software applications; 4. Analyzes mainframe software applications using Knowledgeware's Design Workbench product and application prototype that uses Software AG's Natural application development product to develop and maintain mainframe batch and online software applications; 40 hours per week, 8:30 a.m. to 5:00 p.m., \$60,072/year. B.S. in Computer Science and 7 years experience in the job offered or equivalent. Interested applicants send two resumes to: Ms. Regina D. Ratterree, EAST Technical Services, SCESC-SC20009874, P.O. Box 1406, Columbia, SC 29202.

IMPLEMENTATION CONSULTANT (Cary, NC). Implement, customize & modify CA-Unicenter software products to a client environment to meet specific business needs by implementing Lotus Notes, AS/400 & enterprise mgmt under Windows NT & Novell NetWare platforms. Provide technical support to customer request for assistance in supported problems, set up & use relational database products & assist clients with installation, configuration, maintenance & optimization of database applications. Assist with the use of software which has been developed for database management under various Novell NetWare platforms. Req's BS in Comp Sci, Computer Science or Eng. 2 yr exp offered or 1 yr exp as Computer Consultant or Applications Programmer. The 1 yr exp must include working with Lotus Notes, AS/400, Windows NT, Novell NetWare, enterprise mgmt. 40 hrs/wk; 9:00-5:00; M-F. \$52,000/yr. Apply to the nearest Job Service or submit resume to Job Service, NC7226493 DOT code 030 165-014, 700 Wade Avenue, P.O. Box 27227, Raleigh, NC 27611. All resumes must include the Social Security Number.

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Sr. Software Engineer with demonstrated abilities in the development and delivery of successful production quality commercial software. Should have 3+ years' object-oriented programming experience with proven C++ and C design and coding skills. Experience in the development of algorithms should be able to work productively in Windows / WindowsNT and UNIX environments - must have ability to independently specify, design, and implement software system components. Candidate should have at least BS in Engineering, Computer Science or related field. Experience with database programming and GIS is a plus. Please send resume to: HR Qualitative Marketing Software, Inc., 4750 Walnut, Ste #200, Boulder, CO 80301. Fax (303) 440-3822. e-mail: jobs@gmsoft.com www.gmsoft.com

SYSTEMS ANALYSTS required to analyze, design, develop and administer using Intesolv's APS (Applications Code Generator) toolset, and serve as mainframe DB2 Database Administrator. BA req. in Math, Computers, Engineering or any other related field of study + 2 yrs. exp. in the job duties described above. Must have proof of legal authority to work in the U.S. Salary-\$70,000/yr. for a 40hr. work week. Interested applicants contact the Oklahoma State Employment Service Office, One N. Walker, Oklahoma City, OK 73102, (I.D.#5520). Ph.#: 405-235-5627. Refer to Job Order #388877. An Equal Opportunity Employer.

Multiple openings for permanent Programmer/Analyst and Database/Software Engineer positions from entry to senior-level throughout U.S. to design, develop, program and test business enterprise systems involving TPF, Sales Force Automation, Data Warehousing, Business Metrics, E-commerce, Internet, and others using Object Oriented Programming/Design, Structured Analysis, and distributed systems, and current web technologies. Particular roles include one or more of: Java, C++, COBOL, CORBA, ActiveX, UNIX, SQL, Windows NT, Lotus Notes, Perl, COBOL, Visual Basic, C, C++, COM/DCOM, OLE, CGI, Internet protocols, and others. B.S. in Comp. Sci., Engin, Math or related area. Will accept combination of education, training and experience in lieu of degree. Prior experience and M.S. required for some positions. Competitive salary/bonus/benefits offered. Send resume to: IntelliMark, 200 Commerce Drive, Suite 200, Cranford, NJ 07016, Attn: Carol King.

Computer Sys. Programmer/Analyst - Anchorage, AK Act as team leader guiding team through design/dev. of application enhancements. Analyze Application design, supervision of work, applications modification implementation, testing, documentation & troubleshooting/maintenance procedures. Also large mainframe systems w/ COBOL, ADABAS, Natural CICS, TSO/ISP & DHSS applications. Req: Bachelor's or equiv. in CS & 2 yrs. exp. in the job offered. Educ. or degree is a must. Job offered in lieu of degree. 40 hrs/wk, 8am - 5pm, Salary: \$60,000/yr. Please direct resume to Alaska Dept. of Labor, AL/CASE #1391, P.O. Box 25509, Juneau, AK 99802-5509; Fax: 907-465-5558. EOE



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Seeking professionals with experience in logical database design, data modeling/Entity-Relationship diagramming, meta-data management and ERWin/Platinum; O-O methods preferred.

DATA WAREHOUSING

Seeking professionals with experience in Oracle, Essbase, Business Objects (Sequent a plus), data warehouse design and data transformation/extraction.

APPLICATIONS DEVELOPMENT

Seeking programmer analysts, systems programmers, systems analysts, application developers, group leads and operations specialists with expertise in PowerBuilder, C++, C, Visual Basic, Sybase, Oracle, UNIX, IEF/Composer, COOL: Gen, PCS/ADS, ADS Plus, MUMPS, SAS, EDI, MQ, OBDC, OCC, Corba, COBOL, COBOL II, JCL, MVS, DB2, CICS, Model 204, IMS, MANTIS, Tandem, TAL, DEC/VAX/VMS, PeopleSoft and Tesseract.

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Find out more about Kaiser Permanente Information Technology by visiting www.kp.org/jobs; click on "IT Division" tab. Submit one resume only, referencing Job Code: PAD-CWD1115, preferably by e-mail to: kpitjobs@kp.org, or fax to: 1-800-839-5140. The tangible and intangible benefits of working for an organization of our size and scope will change your career perspective in a healthy way. Affirmative Action/Equal Opportunity Employer. All trademarks belong to their respective companies.



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Baby Boomers bring **NEW** technology demands

Most anyone in the financial services industry will tell you that technology is exploding as baby boomers move into more senior age groups. Not only do they want advisors to help them with their investments, they want access online, and they frequently want information without having to talk to a real person.

The result is an aggressive environment where new technologies take shape on a daily basis, bonding together expansive networks of advisors and opening the door to customers in an entirely new way.

AJILON CORPORATION

Baltimore, MD

As an information technology consulting firm, Ajilon provides a wide variety of services to financial organizations.

"The bulk of our business is direct staff augmentation," says Ernie Paolini, director of national recruiting. "We provide technical expertise when an organization is short-handed. We can work with several levels of involvement — and can offer soup to nuts implementation or work in support of our client's internal IT teams."

Ajilon has openings in application development, system support and administration, technical support and data processing. "No matter what kind of technical qualifications you may have, we need people who are comfortable meeting with clients, understanding their needs and responding," says Paolini. In fact, Ajilon's clients frequently take part in the interviewing process. "We don't offer project-specific employment, which I think is a real selling point for many IT professionals. A major advantage of working for Ajilon is that there is continuous change and challenge."

Among the exciting projects Ajilon supports is one involving Ford Motor Company. It's not a

typical systems solution for an internal network. Instead, it deals with automobile dashboard imaging. "There's also the more typical work of application development and customization, e-business and product-related work," says Paolini.

Once you go to work at Ajilon, Paolini says the support network is strong for people working in the field with customers. Ajilon University offers online education opportunities, running the gamut from GUI technologies to mainframe skills.

During 1999 Ajilon hired about 1,500 new employees. "We will complete the acquisition of another major firm, doubling our size," says Paolini, "and we will be looking to hire an additional 3,200 people in 2000. We will be the largest player in this field, and there will be a lot of opportunities for growth." Opportunities are available in 45 offices located across the United States.

CHARLES SCHWAB & COMPANY, INC.

San Francisco, CA

"Many people say we are a technology company disguised as a financial services company," states Kristen Hunsaker, vice president of

technical recruiting for Charles Schwab & Company. "We look to individuals and technology to drive this business forward. We need the combination of the two to bring the best in financial services and products to our customers."

Currently Charles Schwab's technology group has 1,800 full-time employees working in centers in San Francisco, Akron, OH; Phoenix, AZ; Orlando, FL; Jersey City, NJ; Denver, CO; and Indianapolis, IN.

"The excitement of working for Charles Schwab is that we're solving entirely new business problems," says Hunsaker. "Currently about one-third of our transactions take place online. Imagine the number of hits we have on our site every day. We have to be able to handle that volume of trading without fail."

Charles Schwab is looking for a variety of technology backgrounds. "We need both mainframe and client/server developers — both on the application and system side," says Hunsaker, "specifically individuals with Java, C, C++ experience/skills. The company also has opportunities for individuals with strong operations, system administration and networking experience."



The company looks for people who come from environments that are fast paced. One where there has been a high rate of change and requires individuals to multi-task and anticipate market demands. "Considering the fast pace and complex nature of the

brokerage services industry combined with our global expansion efforts, the technology organization is a key in meeting this type of change and growth. We need people with a track record as a thought leader and for being innovative," says Hunsaker. "We also need technology professionals who are bilingual in Spanish, Mandarin or Cantonese and Korean to make our web sites available in these regions."

Hunsaker says Charles Schwab will hire approximately 100 people before year-end. "We provide training and education that allow you to continuously reinvent your talents, including coursework on leadership in technology," she says. "Schwab promotes ownership in the company and to support that all new employees qualify immediately for stock options. In addition, we have excellent benefits and a strong compensation program that incorporates a quarterly bonus program based on both individual and company performance!"

FIDELITY INVESTMENTS

Boston, MA

Developing new business applications for a company such as Fidelity Investments means your work will be hitting the market immediately, transforming yet another aspect of the financial services industry. "We need people to fill that need, to better prepare us for the future," says Paul Lesser, director of technology staffing for Fidelity.

The future focuses on a variety of technology areas, including Internet security, e-commerce development, systems administration and network engineering. "We want to provide access to our customers in any way they want - whether that's through the mail, a branch office location, over the phone, via their wireless or over the web. Technology is the common thread that keeps all of these methods of interaction working with one another," adds Lesser.

Fidelity offers a variety of services to its customers, from active investment trading to investment alerts via pager, to tools that allow customers to estimate the future value of their retirement accounts.

"We want to provide access to our customers in any way they want - whether that's through the mail, a branch office location, over the phone, via their wireless or over the web. Technology is the common thread that keeps all of these methods of interaction working with one another,"

**Paul Lesser,
director of technology staffing
Fidelity Investments**

(automated telephone messaging). "In addition to having these skills, you need to be able to work on project teams," says Lesser.

FREDDIE MAC

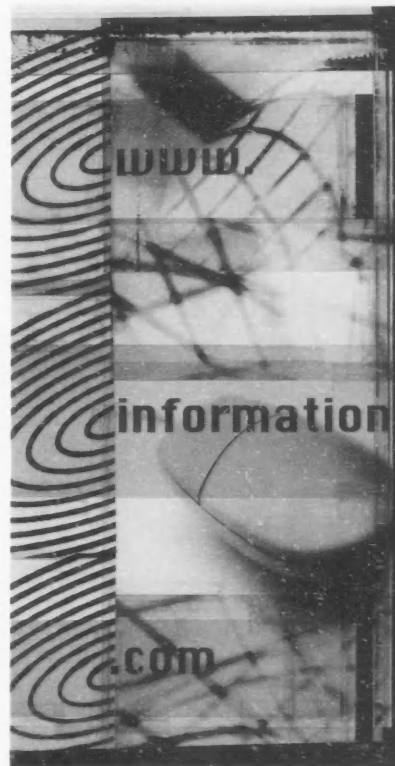
McLean, VA

If you've bought a home or sold one, you probably have been involved with Freddie Mac - whether you know it or not. A publicly traded corporation, Freddie Mac has a single mission: assuring that housing financing is available and more affordable to the American public.

"The people who work here have a strong sense of that mission - of using technology to drive down costs and keep home lending affordable," says Steve Hudson, vice president of technology strategy. "We aren't really a physical business. We price loans, communicate with our customers, purchase loans, transfer information about those loans, conduct risk analysis, securitize the loans and then sell the loans to Wall Street investors. Each of these is a technology-intensive operation."

Freddie Mac's Information Systems group has developed a variety of new applications to help hold the line on costs and speed the approval for home loans. Loan Prospector is a software application that evaluates specific key data, providing loan approvals within minutes. Through Gold Works, another Freddie Mac solution offering network services, Loan Prospector is now being made available to the lending institutions from which Freddie Mac buys loans.

High-end technology is needed to administer the sheer volume of transactions, according to Lesser. In addition, the company utilizes UNIX/NT as well as traditional mainframe technologies. Key skills Fidelity looks for in its IT professionals include Java, JavaScript, CORBA, UNIX and ATM



Cathy Ward, employment manager, says Freddie Mac needs people with a variety of skills, including full life-cycle development (C/C++, UNIX, SYBASE), web development and integration (JAVA, HTML, CGI), object-oriented design, systems architecture and engineering, enterprise security, systems implementation (PeopleSoft) and system administrators (UNIX) and database management.

Freddie Mac's Information System Services plans to fill about 250 technical positions in 1999, about 55 percent as external hires and the remainder through internal redeployment. Career opportunities exist in support of a range of business operations and in testing and developing new technologies. Internal labs and available training enhance learning opportunities, along with a grant program that allows selected employees to earn additional degrees and certifications.

The company's benefits and compensation are competitive. *Washingtonian Magazine* recently named Freddie Mac one of the D.C. area's top employers on the basis of caring about employees and the community. "Employees feel our

mission is important," says Ward. "Volunteerism among our employees, in support of young people and the community, is high. To the extent that you value civic responsibility, we are a great company to work for."

SUNAMERICA INC.

Los Angeles, CA

Over the past quarter of a century, retirement specialist SunAmerica has proven its ability to shift intelligently in a constantly changing marketplace. Originally founded as a division of Kaufman and Broad, Inc., SunAmerica has gone through several evolutions, moving from mortality life insurance to retirement to savings and investments. Sales for the company increased by 60 percent last year.

This aggressive performance comes through traditional growth and acquisitions, making information systems a key to smooth integration and operation. "When we acquire companies, we must quickly convert them to our product lines,"

explains Darlene Valentine, technical recruiter for SunAmerica's MIS organization. "Without information technology, the acquisitions aren't possible. Our role is to enable and determine how to execute the tasks and requirements fitting SunAmerica's business strategy."

SunAmerica operates with an extensive network of broker-dealers and field operations. The company uses a client/server environment, e-business and web-enabled applications to keep the network up and running and to meet customer needs. "Recently MIS provided the full automation system for all broker-dealers across the network. And the group continuously develops and improves the products that assist in managing more than \$3 billion in mutual funds assets," says Valentine. "We need people with web development, e-business, mainframe programming, enterprise data security and client/server skills."

"We're a people-based company. You may be a guru in terms of technology, but with SunAmerica you also have to work within a group operation. It's an aggressive environment where you're required to shift gears and make

decisions on a near-constant basis," she adds.

Valentine says the company offers internal and external training for hot ticket technologies. "But when it comes down to it, it's all about the people you work with," Valentine says. "You'll be working with people who are tops in the financial services technology field. The chemistry is important – you need to be able to break the edge, but also to cut loose."

T. ROWE PRICE INVESTMENT TECHNOLOGIES, INC.

Baltimore, MD

Literally thousands of transactions occur every day over the information technology architecture in place at T. Rowe Price Associates, Inc. Its subsidiary, T. Rowe Price Investment Technologies Inc., is tasked with continuously monitoring and anticipating what new technologies can be used to meet the demands of a dramatically different customer base.

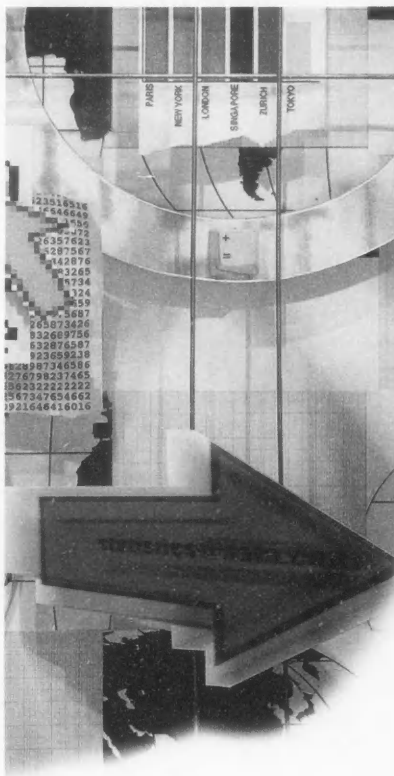
"The demands of baby boomers have drastically changed how we operate. They want more direct access to their account activity, they want it simple and they want to participate. They want us to be their advisor but they also want information without having to talk to someone."

Laura Johnson,
technical staffing manager
T. Rowe Price Investment
Technologies, Inc.

Sound simple? For a company whose business has grown as a result of strong relationships, it's critical that there are no glitches in the application of technology to meeting these needs. The company uses the web to maintain its enterprise-wide applications. In addition to UNIX/NT and mainframe skills, T. Rowe Price needs technical skills in Visual, C++, CORBA, Visual Basic, COBOL/CICS, SYBASE, HTML, Java, JavaScript and Cold fusion to support existing and new product lines such as e-business. "We need people who have the breadth of technology life-cycle skills," adds Johnson.

While the laundry list of needed skills is expansive, T. Rowe Price also continuously upgrades skills internally. Through the Organizational

"The demands of baby boomers have drastically changed how we operate," says Laura Johnson, technical staffing manager. "They want more direct access to their account activity, they want it simple and they want to participate. They want us to be their advisor but they also want information without having to talk to someone."



Learning Group, new employees can continuously assess their own skills and personal needs. Managers also complete an assessment for each employee. "Then you have the information you need to 'brand' yourself to drive your career, building strengths that meet industry and company needs," explains Johnson. In addition, you'll be assigned to a range of business operations to gain perspective about each category.

T. Rowe Price also prides itself on just-in-time education. "For instance, we saw CORBA as an opportunity technology that we rolled out in 1999," says Johnson. "We had people trained and in place when the roll out began. We keep an eye on what is going on in the broader world, and then help you increase your own skills accordingly."

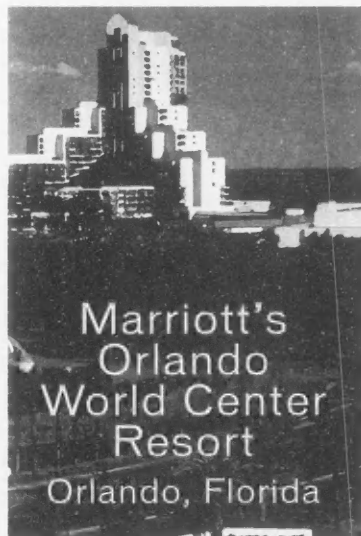
T. Rowe Price's IT group has grown from 200 people just four years ago to more than 675 people today. As the company's business continues to grow, building on the \$156 billion in assets currently under management, hiring will continue.

by Carole Hedden



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- Network Engineers w/Routers, Hubs & Bridges exp
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- AS400 RPG 400, ILE, BPCS or EDI

All positions require a Bachelors degree and at least 2 yrs exp. Send resumes to: HR Dept, Genesys International Corp., 110 Corporate Park Dr., White Plains, NY 10604. Attn: Sr. Fax: (914) 694-1263.

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PROGRAMMER/ANALYST to analyze user requirements. Design, develop, test, implement and maintain software programs for various business, financial, and economic systems using DEC/VAX RDB, DEC Forms, Database, DEC/VAX COBOL, DEC/VAX Basic, DTR, RTI, DCL, and ACMS under VMS and OpenVMS operating systems. Requires: Bachelor's degree (or equivalent) in Computer Science, Business Administration, Economics, or a closely related field, with two years of experience in the job offered. Three years of college education with an additional three years of experience in the field will be considered equivalent to the Bachelor's degree. Extensive travel on assignments to various client sites within the U.S. is required. Salary: \$60,000/yr. 8 am to 5 pm. M-F. Send resume to: Raghavendra Kulkarni, President, Pro Softnet Corporation, 3235 Satellite Blvd., Bldg. 400, Suite 300, Duluth, GA 30096. Attn: Job GV.

SOFTWARE ENGINEER to design, develop, implement and support n-tier client/server and internet application software using object-oriented methodologies. Visual Basic, Access, NT, DCOM, Visual Basic Script, Java Script, ASP, IIS, MTS, DCE, RPC Interface, Oracle, Informis, SQL Server, and MS Access on Windows NT and UNIX platforms. Requires: M.S. degree in Computer Science Engineering, or a closely related field. Must have a demonstrated ability to perform stated duties gained through previous work experience/academic coursework and projects. A B.S. degree with an additional five years of progressively responsible experience in the field will be considered equivalent to a M.S. degree. Extensive travel on assignments to various client sites within the U.S. is required. Salary: \$65,000/yr. 8 am to 5 pm. M-F. Send resume to: Raghavendra Kulkarni, President, Pro Softnet Corporation, 3235 Satellite Blvd., Bldg. 400, Suite 300, Duluth, GA 30096. Attn: Job SG.

SOFTWARE ENGINEER design, develop, test, implement, maintain and support application software using C++, Visual C++, SQL, PL/SQL, Oracle, Access, Java, Java Script, HTML, and Internet Tools under Windows 95/NT and UNIX operating systems. Train and instruct junior programmers in Java, perl, Script, HTML and Internet Tools. Requires: M.S. degree in Computer Science, or a closely related field, with two years of experience on the job offered or as a Programmer/Programmer Analyst. Experience gained before or after earning the M.S. degree will be accepted. Extensive paid travel an assignment to various client sites within the U.S. is required. Salary: \$63,000/yr. 8 am to 5:00 pm. M-F. Apply by resume to: Bharat Aluri, President, Aluri Bharat Analyst, Inc., 3530 Piedmont Rd., Suite 3-C, Atlanta, GA 30305. Attn: Job VT.

Multiple Openings

Burlington, Vt.

Systems Engineer Leader - Engineering leader in the areas of WEB and EDI for Supply Chain Management. Interface with SAP. Applies mathematical modeling skills in Structured Systems Analysis. Design. Req: M.S. and 2 yrs. as technical leader, or B.S. and 5+ years post-B.S. progressive exp in the specialty (Structured Systems Analysis and Design), including 2 years as technical leader. Prior SAP and sales application exp a plus. Ref: SELSR.

Systems Engineer Leader - Leads team of programmer analysts in project in UNIX using C/C++, and standard tools (text and yacc). May also manage E-commerce project on Web using Java and DB2. Applies leadership expertise to system analysis, design, development, testing, documentation and implementation scheduling. Requires mathematical modeling. Req: M.S. in Comp. Sci. or Engrg. 3+ yrs exp in UNIX using C/C++ and standard tools (text and yacc). Ref: SELAS.

Test Automation Systems Engineer Leader - Leads Test Automation & Execution Project using Test Tools and applying knowledge of COBOL, CICS, DB2 & IMS. Mathematical modeling, Structured System Analysis, Design & Development. Task planning, scheduling and tracking. Req: M.S. 3+ yrs exp as project leader in C, CICS, DB2 & IMS, or B.S. and 5+ yrs post-B.S. progressive experience in SSA, Design & dev. Req: 3 yrs exp. prior leader in COBOL, CICS, DB2 & IMS. Ref: TASELCS.

Contact S. Pine, Prosoft Technologies, Inc., 45 Swift Street, S. Burlington, VT 05403.

Object Alliance Corporation, Atlanta, GA based company is actively seeking highly motivated individuals for career opportunities in software development, software engineering and consulting to provide services to our increasing client base. Bachelor's and Masters positions available, with at least two years of experience in various fields such as: 3-tier, Mathematical, Internet, Java, JSP, ASP, JDBC, EJB, Netscape Application Server, Oracle, NetBeans, Tuxedo, Middleware, Application Servers, C++, C, Delphi, PowerBuilder, Visual Basic, MS Access, NT and Solaris/Unix. Excellent benefits. Salary commensurate with education and experience. Please mail resumes to: Object Alliance Corporation, Suite 510, East, 1117 Penimeter Center West, Atlanta GA 30338 or visit our website at: www.objectalliance.com. EOE.

INFO SYSTEMS ADMINISTRATOR Troubleshoot/resolve problems; maintain data backup & archives; User Account Authorization Network Name & IP Address; operating systems & application software; internet & email development/maintenance; data mgmt; Database and MIS Systems Administrator; programmer/analyst duties; install/support PC hardware; support/coordinate direct deposits; BS Computer Sci or equiv + 2 yrs exp as programmer/analyst/software developer. Exp w/ Novell's IntraNetwork 4.x & Microsoft's NT4. Microsoft's SQL Server 6.5, Visual Basic SQL & Visual Basic for MS Access 97 or equiv reqd. 40 hrs/wk, \$47,000/yr. Send resume to: Cooperative Baptist Fellowship, Attn: Gary Steen, 3001 Mercer University Dr., Atlanta, GA 30341.

Principal Software Engineer. Design and develop distributed computing client/server-based applications within Windows and UNIX environments. Design and code 32-bit Microsoft Windows-based GUIs. Work with ODBC, SQL Triggers and stored procedures using database systems. Work with cross platform software development on Unix platforms. BS (comp sci, rel. fields) req'd. 5 yrs exp (or 5 yrs exp as Software Engineer). 40 hrs/wk. Send resume to: Human Resources Department, Visa Consultancy Services, Inc., 83 Second Avenue, Burlington, MA 01803.

SOFTWARE ENGINEER to design, develop, test, implement, maintain and support application software under client/server, 3-tier architecture using object-oriented methodologies and programming in Visual Basic, PowerBuilder, Oracle, MS Access, D-base IV and Crystal Reports under Unix and Windows operating systems. Requires: M.S. degree in Computer Science, an Engineering discipline, or a closely related field. Must have a demonstrated ability to perform the stated duties gained through previous experience/academic coursework and projects. Extensive travel on assignment to various client sites within the U.S. is required. Salary: \$65,000 per year, 8:00 am to 5:00 pm. M-F. Apply by resume to: Michelle Knight, HR, Global Consulting Services, Inc., 3700 Crestwood Parkway, NW, Suite 160, Duluth, GA 30096. Attn: Job UT.

SYSTEMS ANALYST - In a consulting env. meet with client user mgt. (primarily traders) to assess requirements pertaining to the develop of software systems to support foreign exchange netting & brokerage services. From req provide analysis & design of business & technical specifications to run in networked midrange client server VMS & Windows NT env. from which develop can proceed. Provide working prototypes & test utilizing Delphi & Visual Basic. Req: 4 yrs exp in job or related C/C++ & MS, or analyst Programmer. Must have one yr full time exp with Delphi, Visual Basic & VMS & 3 yrs exchange netting & brokerage software. 40hrs/wk, \$65,000/yr. Send resume to: Dept. of Labor/Bureau of Workforce Prog. Support P.O. Box 10868, Tallahassee, FL 32302 RE: JOFL # 2017484.

Software Engineers (multiple openings) wanted by Woodbridge NJ based IS/IT Professional Services Co. for locations in the U.S. Must have Masters in Comp Sci, Engg (any field) & 2 yrs w/s/ware experience. Respond to: HR Dept, Future Technologies, Inc., One Woodbridge Center, Ste 330, Woodbridge, NJ 07095.

Network Administrator sought by Computer N/work Systems Developer in New York City. Must have Bachelors in Engg or Comp Sci & 1 yr exp maintaining client n/works; and configuring d/bases & n/work servers. Respond to: HR Dept, Attn: D. Rosen, Total Networks Solutions, 545 Fifth Ave, 14 Flr, NY, NY 10017.

Programmer Analyst, Westport, CT; Analyze, design and develop applications using Delphi and Object Oriented Techniques. Debug and test Delphi programs. Write, debug and test Sybase, SQL code and triggers for stored procedures for database testing. Req'd: 2 yrs exp in job offered or 2 yrs exp in a Computer Related Profession. 40 hrs/wk, 8:30 am - 5:30 pm, Mon - Fri. Send resume to: Triple Point Technology, Inc., 301 Riverside Avenue, Westport, CT 06880. Attn: Human Resources Manager.

Programmer/Analyst (graphics) F/T req by design & production company of 2D computer graphic software in St. Rose, Louisiana. Must have Bachelors Degree in Computer Science or Engineering Physics, and 2 years experience. Respond by Resume to: Personnel, Digimation, Inc., 107 Mallard Street, Suite D, St. Rose, Louisiana 70087

Worldwide Trade Resources, Inc., a CT Comp Cons Co seeks to fill multiple positions for a Software Engineer w/MS in Comp Sci, Engg, Math or its equiv & 3 yrs of related exp. Will accept BS in Comp Sci, Engg, Math, or its equiv and 5 yrs of related exp in lieu of a Masters & 3 years experience. Mail res to HR Dept, WTR Inc., 61 Deerfield Drive, Glenburry, CT 06033.

Sr. Programmer Analyst needed by Restaurant Franchising Co. in Ft. Lauderdale, FL. Must have BS in Comp Engg & 4 yrs exp planning, dvlp, testing & documenting comp pgms & evaluating user requests for finl mgmt systems. Respond to: Mr. Sule, Tharc Restaurant Group, 1000 nrg (any field) & 2 yrs w/s/ware experience. Respond to: HR Dept, Future Technologies, Inc., One Woodbridge Center, Ste 330, Woodbridge, NJ 07095.

Systems Analyst wanted by Iseini, NJ IS/IT Consulting Services Co. Must have Bachelors in Comp Sc, Engg & 1 yr s/ware experience. Apply by resume to: HT Dept, MJ Technologies of NJ, Inc., 762 Green St, Ste 2C, Iseini, NJ 08830

Software Engineers needed in NJ & CO for NJ IT Co. to design & setup databases and dvlp appl using Oracle, SQL Server & Clarify. Apply to D. Vespe, TimeBridge Technology, 700 E. Gate Dr. #240, Mt. Laurel, NJ 08054.

Application Developers needed to design, dvlp, code, and test customer integration of telecom. software applications using UNIX and Oracle. Apply to Global Consultants, 601 Jefferson Rd, Parsippany, NJ 07054.

Software Engineer: Analyze user req's to determine software engineering requirements & feasibility for migrating Infoscan/Oscan apps to Client/Server architecture; using C and C++, formulate, design, code and test computer software systems for applications on UNIX platform. Oracle database, test, code and document software apps. Significant and frequent travel. F/T-M-F Req'd: M.S. in C.S. or Electrical Engineering, 1 year of experience in software development. Send resume to: Computerworld - 12927, 500 Old Conn. Path, Framingham, MA, 01747.

Programmer/Analyst: Design, development and implementation of application software using ADW (KEY), IDMS, COBOL and CICS in CICS and MVS batch environments on IBM mainframes. Plan, develop and test programs. Requires: 2 yrs exp in job offered or 2 years exp as Programmer or related position with same duties and B.S. in Engg, Comp Sci or a related field. Exp. rel. required. Salary: \$62,000/yr. EOE. Send resume to: DellSoft, 106 Bombay Lane, Roswell, GA 30076.

Programmer - Analyst: Design, development, coding and implementation of web-based software using HTML, Java, JavaScript and TCP/IP. Develop and test programs. Requires: 1 & 1/2 yrs exp in job offered or 1 & 1/2 yrs exp as a Programmer or related position with same duties and B.S. in Engg, Comp. Sci. or a related field. Exp. rel. required. Salary: \$62,000/yr. EOE. Send resume to: BPL Systems, 7001 Peachtree Ind. Blvd., Suite 231, Norcross, GA 30092.

Applications Engineer with exp. req'd. B.S. with substantial exp. also accepted. • Project Managers-M.S. with exp. req'd. B.S. with substantial exp. also accepted. • Database Administrators and Programmer/Analysts B.S. req'd. Respond to: Cristian Thaumaturgus Inc., 317 Madison Ave. #1615, NY NY 10017. employ@tgix.com

Computers: • Software Engineers-M.S. with exp. req'd. B.S. with substantial exp. also accepted. • Project Managers-M.S. with exp. req'd. B.S. with substantial exp. also accepted. • Database Administrators and Programmer/Analysts B.S. req'd. Respond to: Cristian Thaumaturgus Inc., 317 Madison Ave. #1615, NY NY 10017. employ@tgix.com

Cambridge MA S/W Dev firm seeks Software Engineers to develop products. Requires BS CS, EE, or Electronics Eng w/ 2 yrs exp dvlpmt ind 1 yr C/C++ using X/Windows and OSF/Motif on Solaris, HP, UX, IRIX, or AIX or exp. Reply to HR 1099, Integrated Computer Solutions, Inc., 201 Broadway, Cambridge MA 02139.

Systems Analyst Communications Specialist needed by Miami, FL Co. involved in Divpt of Banking S/ware for Latin America. Must have 4 yrs exp researching, dvpg, dvlpng & prgmng comp s/ware, its communication interfaces w/AS/400 systems for Latin American Banks. Respond to: HR Dept, Dalapio, Inc, 1300 Brickell Bay Dr, Miami, FL 33131.

Programmer/Analyst sought by MA Co. involved in Divpt of Hospital Resource Utilization S/ware. Must have Bachelors in Comp Sci, Mechanical Engg or related eng field & 1 yr computer exp in VB & Relational databases. Respond to: HR Dept, The Oak Group, 888 Worcester St, Ste 370, Wellesley, MA 02462-3731.

Systems Analyst, Westwood, MA; Analyze, design/develop and implement Client/Server and Oracle Financial, HR Functional applications using Oracle General Ledger, HR Admin. and Security of Oracle application Library: BPR techniques, Oracle DB on VAX/VMS, UNIX, Windows NT/95 platforms. Req'd: Bachelors in Bus. Mgmt. Or Comp. Sci. 1 yr exp. in job offered 40 hrs/wk, 9:00am-6:00pm, \$62,899.20/yr. Submit two (2) copies of resume in response to: Case #19982129, PO Box 8908, Boston, MA 02114.

Analyst/Programmer: Analyze and develop client-server and web development using SQL Server, Access, Visual Basic, and Visual Interdev. Able to build data warehouses and data marts using SQL Server and SAPgent Data Warehousing tools. Must have at least an MS degree in Computer Science, and two yrs of exp. in above position or two yrs. exp. as Analyst/Programmer or rel. w/ability to use: Server, Access, Visual Basic, Visual Interdev, & able to build data warehouses. 40 hr/wk, \$70,400/yr. 8:00 AM-5:00 PM. Applicants send resume to: Human Resources Department, 441 Baxter Street, Ste 120, Charlotte, NC 28202.

Software Engineer, 8a-5p, 40hr/wk. Create, dvlp, dsgn data models & s/ware applics developed in VAX/VMS envrmt & d/base tools Rectal & Oracle, Microsoft C & Assembler, Unix/Oracle & Cognos's Impromptu. Masters or equiv in Comp Sci or Engg; Electrical or Electronics Engg; Physics, Statistics or Math. No exp reqd. Job loc - Alpharetta, GA. Send resume to: Narayan H. Swamy, President, Professional Software Consultants, Inc. 320 Wyehwood Ct., Alpharetta, GA 30202

Software Design Co. seeks Senior Developer in Manh, NY. Dsgn, dvlp, enhance, implt, maintain, test & export project actgty business applics on Win 95/NT platform w/MS SQL Server using Visual C++, C, HTML & Java lang; assist in prp'n of technical documentation; research & dvlp new envrmt & technologies. Req'd: BS (or equiv) in CS or rel'd field, 3 yrs exp applt. devel. environ. Competitive salary. Reply to HR, Paradigm Software Technologies, 641 Ave. of the Americas, NY, NY 10011. www.pdmtch.com

computerworld.com

COMPUTERWORLD
CAREERS

Software Engineer
sought by S/ware
Engg Consultant
Services Co. in Sugar
Land, TX. Must have
BS in Comp Sci or
Comp Engg & 5 yrs
exp in Oracle applica-
tions. Respond to: HR
Dept, K & W Software
Services, Inc, 2615
Sugar Mill, Sugar
Land, TX 77479.

Global Database Administrator
Install, customize & upgrade IBM
DB2 & database admin tools; mon-
itor & tune DB2 subsystems;
maintain & create database rou-
tines; create logical & physical
design of DB2 databases; perform
backup & recovery for all db/dvd
databases; act as technical adviser
to mgmt on global database design
& technology; provide tech sup-
port BS in Comp Sci or related
field + 3yr exp in job offered or as
DB2 Admin or similar duties
under different job title. 3yr exp
w/DB2 & DB2 monitoring tools.
Exp installing OEM pgs in MVS
environment. Demonstrated analyt-
ical & project mgmt skills for
implmt of database projects. Good
oral & written communication
skills. 40hrs/wk., \$65K/yr. Must
have proof of legal authority to
work in US. Send resume to: IA
Workforce Ctr, 2213 Grand Ave,
Muscatine, IA 52761-5650. Refer
to JCW IA1103980. Employer
paid ad.

Programmer/Analyst
In-house title:
Senior Staff Analyst
Multiple positions: 15
Monday through Friday: 8 a.m. to
5 p.m.: \$42,089 to \$65,000 annu-
ally. Required is a Bachelor of
Science or Arts or degree or its
equivalent in Computer Science,
Engineering, Math, Physics, or
Business and one (1) year of re-
lated experience in the job being
offered or one (1) year of related
experience as a Programmer and/or
Systems Analyst. As
equivalent to a baccalaureate
degree, employer will accept
three years of programming and/or
systems analysis experi-
ence for each year of formal ac-
ademic training lacking. Required
experience prerequisites one (1)
year of experience in one or
more programming languages,
as well as data bases, and with
PC or Unix computers. IBM
AS/400-specific experience,
AS/400 COBOL, or RPG as well
as C, C++, SQL, DB2, and
DOS are required. PC experi-
ence includes SQL databases
and language mix from Access,
PowerBuilder, VB, C++, Java,
Script, and Visual Basic. In
addition, experience in one or
more environments involving large
systems, mid-range systems or
mainframes, with client-server,
distributed, and/or computer
science principles in the design
and development of high quality
applications or products. The
software associated with user
interface applications and vari-
ous platform architectures, in-
cluding design and development
of real-time embedded systems,
signal processing, user interface,
client-server, industrial controls,
or image processing applications.
Creates software programs with
structures that will carry for-
ward to future platforms and
develops system control code
and complex computer programs
via the use of C or C++, UNIX,
relational databases, embedded
operating systems, and process-
ing, VAX/VMS, RDB, C, MS-
DOS, WINDOWS with Visual
Basic or Visual C++ and/or
C++ in a Client Server environment.
Performs database and system
administration functions that
include design integration, im-
plementation, and maintenance. Assists
managers with team and project
coordination functions. Commu-
nicates progress, issues, and
concerns among project teams,
customers, and management.
Must have proof of legal author-
ity to work permanently in the United
States. Interested applicants
submit two (2) resumes with ref-
erences to: Case # C101286,
C101287, C101288 to Mr. Mike
Brooks, Department of Work-
force Development, P.O. Box
7903, Madison, WI 53707-7903.

Software Engineer
In-house title:
Senior Staff Analyst
Multiple positions: 25
Monday through Friday: 8 a.m. to
5 p.m.: \$42,089 to \$65,000 annu-
ally. Required is a Bachelor of
Science or Arts or degree or its
equivalent in Computer Science,
Engineering, Math, Physics, or
Business and one (1) year of re-
lated experience in the job being
offered or one (1) year of related
experience as a Software
Developer or Programmer/Analyst. Related experience pre-
supposes one (1) year of prod-
uct-related or applications experi-
ence in one of the following skill
areas: C or C++, UNIX, plus a
database (INGRES, SYBASE,
INFORMIX or ORACLE).
Embedded Processors
Assembly Languages (68000
series and/or 80x86) real-time;
DSP or image processing;
VAX/VMS, RDB, C or MS-WIN-
DOWS with VISUAL BASIC or
VISUAL C++; Client Server,
AS/400, or equivalent to a
baccalaureate degree, employer
will accept three (3) years of pro-
gramming and/or systems analy-
sis experience for each year of
formal academic training lacking.
Position requires the utilization of
engineering and/or computer
science principles in the design
and development of high quality
applications or products. The
software associated with user
interface applications and vari-
ous platform architectures, in-
cluding design and development
of real-time embedded systems,
signal processing, user interface,
client-server, industrial controls,
or image processing applications.
Creates software programs with
structures that will carry for-
ward to future platforms and
develops system control code
and complex computer programs
via the use of C or C++, UNIX,
relational databases, embedded
operating systems, and process-
ing, VAX/VMS, RDB, C, MS-
DOS, WINDOWS with Visual
Basic or Visual C++ and/or
C++ in a Client Server environment.
Performs database and system
administration functions that
include design integration, im-
plementation, and maintenance. Assists
managers with team and project
coordination functions. Commu-
nicates progress, issues, and
concerns among project teams,
customers, and management.
Must have proof of legal author-
ity to work permanently in the United
States. Interested applicants
submit two (2) resumes with ref-
erences to: Case # C101286,
C101287, C101288 to Mr. Mike
Brooks, Department of Work-
force Development, P.O. Box
7903, Madison, WI 53707-7903.

Validation Engineer Designs,
develops and implements soft-
ware validation practices and
establishes system validation
strategies for Medical Diagnostic
Imaging Software. Performs other
product offerings of the com-
pany's Global Software Operations
Division. Takes a lead in defect
identification, investigation and
resolution. Conducts thorough
software product validation of the
software to ensure that customer
requirements are being met and
to ensure that customer expecta-
tions are exceeded. Performs
validation analysis for soft-
ware development proposals
and establishes tests to ensure
that the requirements are met or
exceeded. Interfaces with the
software development team to
assist in product defect resolu-
tion. Monitors the maturity of the
medical diagnostic imaging,
image rendering, networking,
archiving, filming and portability
features of the software devel-
oped on Sun's (Ctane, C2 and
Indigo workstations) and Sun's
(Ultra and Sparc) workstations.
Ensures that the software
development team, with their
multitask and cross-functional
teams to ensure effective devel-
opment, integration and assurance
of the developed technology.
Ensures that the performance
expectations of the developed
software are consistently met.
Ensures the backward compati-
bility of the developed software
with those existing in the field.
Automates software testing and
loading. Identifies and establish-
ing test components of the
software development process.
Maintains, upgrades and
implements test scripts. Investigates,
improves and simplifies test doc-
umentation and updates with
current augmentation and structure
updates. Creates, maintains, and
updates web-documents per-
taining to software valida-
tion related issues on a weekly
basis. Maintains, reorganizes,
updates and authors web pages
preferably from the following
metrics: measure/refer to status
of quality documents, identifies
needed for such documents, and
creates/assists in creation
of such documents. Required is a
Bachelor of Science degree in
Computer Science, Computer
Engineering or Electrical
Engineering and two (2) years of
experience in the position being
offered (i.e., Validation Engineer).
OR two (2) years of experience
as an Engineer in Systems
Analyst. As part of the required
experience in the position being
offered or in the related occupa-
tion, the applicant must have had
experience in the UNIX develop-
ment environment using SGI,
Sun and Hewlett Packard
Workstations; had experience in
software testing similar in the
company software development
lifecycle; had programming experi-
ence in the following program-
ming languages: C, C++, C++,
C++, UNIX, PERL, LaTeX, Shell
Scripting, Script, CGI, TCL and
HTML, and had experience in
hardware integration, worksta-
tion maintenance and peripheral
connectivity. Monday through
Friday: 8:00 AM to 5:00 PM, 40
hours per week; \$65,000 annu-
ally. Qualified applicants submit
two (2) copies of resume and
cover letter to: Global Outreach
File #C101030; DWE-ALC; PO
Box 7972; Madison, Wisconsin
53707-7972. Reference File
#C101030.

Manager, Network Services, North America Manages the development,
provision and support of medium scale, computer network systems to
support business units and functional areas for the Asia/Pacific region,
North and South America, Europe and the Asia/Pacific region. Account-
able for the effective and efficient use of computer network resources
operated and maintained by other Information Services (IS) groups.
Provides the business units and functional areas assigned. Manages
the detection, diagnosis and resolution of complex network problems,
including network traffic analysis and reporting. Oversees the creation
and maintenance of network documentation and diagrams. Supervises
the development and enforcement of standards and policies relating to
support of network services to the enterprise. Manages the creation,
storage and integrity of hardware and software configurations. Manages
the development and enforcement of standards and policies relating to
network security and integrity. Manages installations, modifications and
changes to the network architecture, while maintaining a minimum of
98% service availability. Oversees the management of network capacity
and hardware inventory, including management of spare components to
facilitate recovery of failed devices. Manages hiring, development and
direction of team of talented network professionals, including objective
setting and review, development of training plans and personal coach-
ing. Develops Annual Operating Plan (AOP) for department and man-
ages annual budget of approximately \$5 million. Manages supplier rela-
tionships for provisions and support of network hardware and software.
Authorizes payment to suppliers for provision of external services.
Reviews alternative solutions to network issues and requirements,
choosing the solution which best serves the corporation, functionally,
technically and economically. Provides consultancy to executive busi-
ness units (management, management, management) and senior regional
departmental (IS) technical committees for the development of stan-
dards and departmental and company training programs, acting as
facilitator as and when required. The applicant must have had experi-
ence in a Bachelor of Science degree in Computer Science or related
degree in Electrical or Electronic Engineering, or Computer Science and
five (5) years of experience in the position being offered or five (5) years
of experience in the related occupation of Network Systems Engineer.
The employer will accept an Associate in Science degree and seven (7)
years of experience in the position being offered or in the related occu-
pation. As part of the required experience in the position being offered
in the related occupation, the applicant must have had experience in
the design, provision, management and support of complex networks,
including use of network management, analysis and reporting tools -
HP OpenView, Netview, Netview, Netview, Netview, Netview, Netview,
Sniffer, and Compuserve-ECOTools; had experience in Wide Area
Network (WAN) and Local Area Network (LAN) technologies and proto-
cols, including the following: X.25, X.400, Frame Relay, ATM, Ethernet,
Token Ring, FDDI, T1, SDH, SDH, SDH, SDH, SDH, SDH, SDH, SDH,
NETBIOS/NetBIOS, FTP, DNS, SDLC, LLC; had experience with the con-
figuration and support of network hardware components, including
routers, switches, hubs, bridges, multiplexers, modems, and CSUs.
The applicant must have had experience in the related occupation of
(Network) Systems Engineer, or related occupation, and must have had
experience in the evaluation, selection and provisioning of network and
telecommunications solutions, including the selection and provisioning of
work, including an understanding of national and international network
and telecommunications standards and best practices. Monday through
Friday: 8:00 AM to 5:00 PM; 40 hours per week; \$75,000 annually.
Qualified applicants submit two (2) copies of resume and cover letter
to: Mike Brooks File #C101260; DWE-ALC; PO Box 7972; Madison,
Wisconsin 53707-7972. Reference File #C101260.

Computer Operations Manager
(Chicago, IL.)—Plan, organize,
direct and coordinate the operation
of financial software created for
European economic systems for
use in the United States. Must
have end-user to identify needs
and determine usefulness for
U.S. financial institutions and
coordinate the efforts of compu-
ter programmers using Windows
and Windows NT. In: S, C, C,
C++, and Java to adapt existing
financial software for U.S. econ-
omies applications, including
loan amortization and tables,
credit card issuance; and U.S.
Finance or related area. Fax
resume to View Outenpark at
312-640-2879 or email:
info@center.com.

Computer Engineer
wanted by Computer &
Parts Distributor in
Houston, TX. Must have
BS in Comp Sci, Comp
Engg or Electrical Engg
& 6 mos computer experi-
ence. Respond to: HR
Dept, Lonestar Computer
Distributor, Inc,
9521 Town Park,
Houston, TX 77036.

The sharpest
tool in I.T.
recruiting is

COMPUTERWORLD
Over 2.7 million
monthly page views
To place your job postings
and banner advertising
call 1-800-343-6474, x8000

SYSTEM ANALYST - BS in
computer Science, MIS or
related. Must have 9-months
experience in job offered or 9-
months in job related as Sys-
tems Analyst. Analyze account-
ing and financial data to design
and enhance specialized soft-
ware applications. Install, test and
configure, optimization of
Windows NT, DHCP, WINS, MS
Internet and Proxy Server. Use
all phases of the software de-
velopment cycle and method-
ology. Software development
using HTML, JAVA and MS In-
terDev. Data modeling, tool
selection, technical architec-
ture, procurement and imple-
mentation for design and con-
struction. Use RDM's includ-
ing logical design and model-
ing, Design World Web pages.
40 hours per week, 8:00 am to
5:00 pm. Salary \$49,800.00
per year. Qualified applicants
send resumes with social secu-
rity number to the Indiana De-
partment of Workforce Develop-
ment, 10 N. Senate Ave.,
Indianapolis, Indiana 46204-
2277. Attention: DPG, ID #
8060851.

Computer Programmer - develops
and tests application
programs based on written or
verbal specifications from Systems
Analysts using COBOL
II, CICS and DB2 languages in
an IBM C/MVS/ESA environ-
ment; increases operating
efficiency of or adapts programs
to new requirements; cor-
rects program errors; completes
documentation of program de-
velopment. Must have docu-
mentable ability to program in
COBOL II, CICS and DB2 for
diverse business and technical
applications. B.A. or B.S. de-
gree in computer science or
computer. Hours: Mon. - Fri., 7:30
A.M. - 5:30 P.M., Lowell, Ark.
Salary: \$33,500-\$45,000 year,
plus experience. Apply at Ark.
Employ. Sec. Dept., 1626 S. 8
St., Rogers, AR or send 2 re-
sumes to David Hayes,
2861, Little Rock, AR 72203,
job order #418230.

At Lucent Technologies, we're
defining the future of telecom-
munications. We're looking for in-
dividuals with an MS and/or 1-2
years of directly related experi-
ence in Software Engineering,
Software Engineering, Database
Engineering, Software Architec-
ture, Software Testing, System
Administration & Integration,
Electrical Engineering, RF
Engineering, IS Managers, IS
Analysts (Oracle Development/
Applications, Network C++/
WinNT Development), UNIX
Systems Administrators, Net-
work Analysts and Phrase
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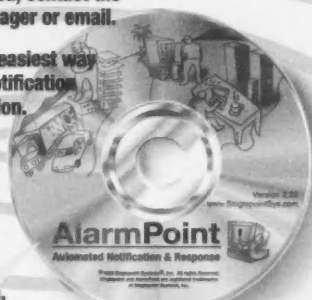
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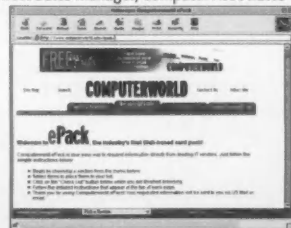
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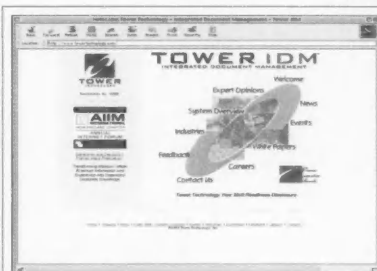
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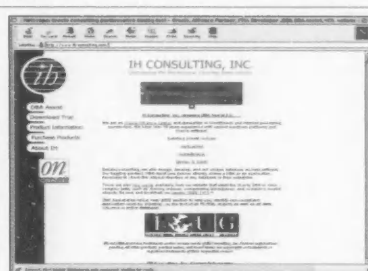
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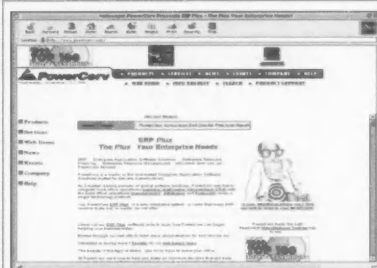
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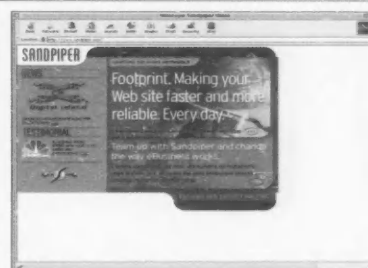
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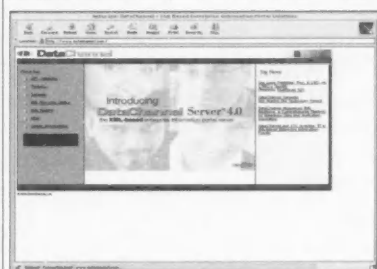
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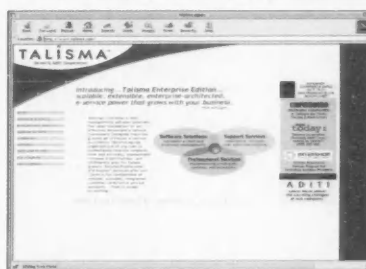
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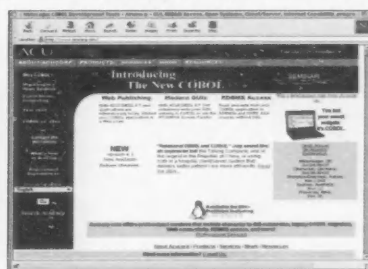
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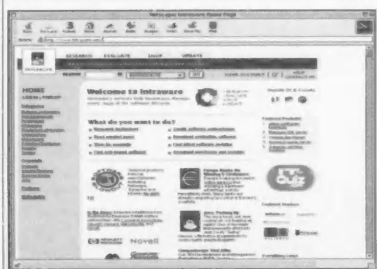
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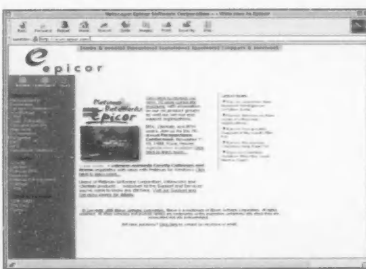
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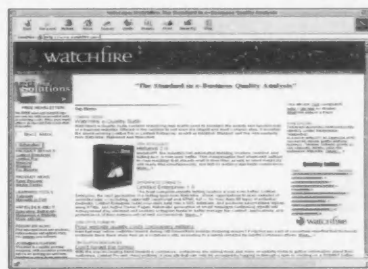
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ALLIANCE MEDICAL CORP.	86	COMPUTER ASSOCIATES	32, 94, 95, 138	GLOBAL VILLAGE	24, 32, 138	LUCENT SOFTWARE SOLUTIONS GROUP	99	PRATT & WHITNEY CANADA	1	TEXAS INSTRUMENTS INC.	10
ALLIANCE MEDICAL CORP.	86	COMPUTER ASSOCIATES	32, 94, 95, 138	GLOBAL VILLAGE	24, 32, 138	LUCENT SOFTWARE SOLUTIONS GROUP	99	PRATT & WHITNEY CANADA	1	THE APACHE SOFTWARE FOUNDATION	8
ALLIANCE MEDICAL CORP.	86	COMPUTER ASSOCIATES	32, 94, 95, 138	GLOBAL VILLAGE	24, 32, 138	LUCENT SOFTWARE SOLUTIONS GROUP	99	PRATT & WHITNEY CANADA	1	THE BODING CO.	4, 8, 104
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Holiday Sales

ping, free gifts and discounts to lure customers.

Despite planning and testing before big online events, Web site managers are being blindsided by traffic beyond their wildest expectations.

Music retailing site Virgin Megastore Online was overwhelmed for several days after a surge of shoppers rushed to take advantage of a 50%-off Labor Day sale. Traffic was 40 times the normal level.

High Traffic

Encyclopedia publisher Britannica.com Inc. last month offered its content free after years of charging a \$5 monthly fee. The site faltered on its first day when traffic reached 20 times normal capacity. Visitors were turned away for more than a week.

What can online retailers do to prepare for the holiday rush? Observers have urged companies to throw out brick-and-

mortar marketing models and test their whole infrastructure, not just the front end.

When a brick-and-mortar store sends out a promotional flyer, retail models predict how much traffic is likely to result. But online, "they don't realize there's so few barriers to people clicking to a site," said Alan Wexelblat, information architect at Mainspring Communications Inc., an e-commerce consulting firm in Cambridge, Mass. Foot traffic may build over a week's time in dozens of stores, but millions of online shoppers can hit one Web site in a day, he said.

"I would never recommend that someone send out 62 million new ads at one time to test their sites. Do a million at a time and build awareness," said Maureen Stancik, project manager for online retail and distribution at Mainspring.

Once the groundwork is laid for an online event, both front-end and back-end systems must be tested.

Toysrus.com officials said the company quadrupled its servers in anticipation of a

High-Profile Promos and Pitfalls

Last week	Toysrus.com crashed after 62M customers received a holiday offer for free shipping, \$10 off for new online customers and a free Tickle Me Elmo doll. Traffic was 10 times normal volume.
October	Britannica.com slowed the first day after offering customers free content. Customers were turned away for more than a week. Traffic was 20 times normal volume.
September	Virginmega.com crashed after customers were offered a 50% discount on orders made over Labor Day weekend. Traffic was 40 times normal volume.

spike in traffic yet was still overwhelmed by demand.

"You don't just multiply your servers by 10 and expect it to deal with the traffic," Stancik said. When site visitors go beyond the home page and browse dozens of items and make multiple transactions, back-end processing is increased 100 times, she said.

Servers may get a customer onto the site, but processing the order depends on the sophistication of the back-end

database. Older systems may run slowly, Stancik said.

Also, the network system that links servers and the database needs to be optimized to prevent bottlenecks, she said.

Companies should also consider using a distributed server farm during peak times.

Send.com, an online gift merchant in Waltham, Mass., launched its first nationwide TV advertising campaign Nov. 7 and was prepared for a spike in demand, said Ken Surdan, vice

president of technology and systems development [News, Nov. 3]. As a result of the ads, "we've seen a 300% increase" in traffic, Surdan said, with "no issues whatsoever."

As insurance, Send.com ramped up nine new Web servers — dual-CPU Compaq Computer Corp. i850Rs — just before the ads hit TV. The company also "double- and triple-checked" with its application service provider, Andover, Mass.-based NaviSite Inc., to ensure that Send.com's outsourced network infrastructure was ready.

Customers will be less forgiving of faulty sites this holiday season, noted Elaine Rubin, chairman of Shop.org, an Internet retail association in Silver Spring, Md. "They have so many options. You're a click away from another 15 sites that do the same thing," she said. ■

Steve Ulfelder contributed to this report.

MORE THIS ISSUE

For more on e-commerce and the pitfalls of creating demand, see page 45.

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Users Back SAP

to light [Page One, Nov. 1]. Phillips called SAP and IBM "to find out what makes my implementation different."

What they told him "is that I'm doing the right things," Phillips said. And it has more to do with the way Lockheed Martin is planning and managing the project than with the software itself, he added — a point of view that was seconded by several other R/3 users last week in the aftermath of Hershey's problems and similar snafus at Whirlpool Corp. [Page One, Nov. 8].

Farmland Industries Inc., a \$10.7 billion farmer-owned cooperative in Kansas City, Mo., found that out after going live with a version of R/3 tailored for oil and gas users two years ago.

Farmland has had only minor problems with the software, said Dick Weaver, technology manager at its petrole-

um and crop production units. But changing the way the company does business to take full advantage of R/3 has been a sticky proposition, he added.

Because Farmland didn't do much of that work up front, its finance and order-entry operations didn't see the kind of savings they were looking for, Weaver said. Now the cooperative is going back and making the business-process changes that were put off earlier in the project. "If you just put in SAP, you haven't gained a whole lot," Weaver said. "Two years into it, we're getting a lot of value. The first year, we didn't."

At Lockheed Martin Aeronautics, 900 business users from its three aircraft manufacturing companies have been working since last spring to design common ways to enter orders and process other transactions in R/3, Phillips

said. When that's done in December, several hundred users will test the system for another six months.

Lockheed Martin rolled out R/3 at an aircraft maintenance operation in June and added SAP's human resources software last month to get its feet wet before bigger installations at the manufacturing units. Its project team also sought advice from Pratt & Whitney Canada, an aircraft engine supplier that did an R/3 rollout last year.

Phillips said he also "fired" some IBM consultants and asked the company to send more capable replacements. The

goal of those moves was to lower the risk of the project going awry "to a manageable level before we pull the trigger," he said.

SAP's software isn't always perfect. The German vendor has had major problems with a

version of R/3 aimed at apparel and footwear companies. Phillips said SAP had to make big improvements in an aerospace and defense release in the past six months or else Lockheed Martin would have had trouble moving forward.

SAP and its rivals also can be overzealous in selling users on how quickly they can install an ERP system, said Joshua Greenbaum, an analyst at Enterprise Applications Consulting in Berkeley, Calif.

But in most failed projects, the applications aren't at fault, Greenbaum added. "Software doesn't kill companies," he said. "Bad management does."

"To suggest that SAP's software doesn't work is ridiculous," said Ed Toben, CIO at New York-based Colgate-Palmolive Co. The \$9 billion consumer products company has installed R/3 in 41 countries that account for nearly three-quarters of its sales.

Toben said the problems at Hershey and Whirlpool haven't shaken his faith in SAP. In fact,

they have reinforced the belief that Colgate-Palmolive was right to avoid trying to integrate non-SAP applications with R/3.

"This is complicated stuff, and you have to do anything you can to simplify it," Toben said.

Before, at Elf Atochem North America Inc., a chemical maker in Philadelphia, a team of 24 workers spent four months redesigning business processes before the company even chose R/3.

"If you have good technical resources, you can get the software installed," said Ben Vetese, director of SAP applications at Elf Atochem. "But getting it to work within a business is a lot harder."

Hasso Plattner, SAP's co-chairman, defended R/3 last week, saying that "99% of our customers are happy." At Hershey, for example, SAP "did a good implementation, and it's not our fault," he said.

But Plattner said the problematic rollouts are being noticed. Prospects ask, "Am I the next one on the list?" he said. ■



COLGATE-PALMOLIVE'S ED TOBEN has faith in SAP

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FRANK HAYES/FRANKLY SPEAKING

Memo to Hasso

MAYBE HASSO PLATTNER figured nobody would notice. With all the hubbub over Microsoft's bad news in its antitrust trial, maybe SAP's head honcho thought it would be OK to spout the kind of self-indulgent baloney we expect in Bill Gates' worst moments. Gates has been known to tell interviewers that Microsoft products have no bugs when they ship. Last week, Plattner said all those stories about catastrophic problems with SAP R/3 keep showing up because American reporters hate Germans. Or because customers are afraid to ask for help. Or because — horrors! — those customers are also using software from SAP's competitors.

"It's not our fault," Plattner said. And in particular, making SAP R/3 work with software from competitors like Siebel and Manugistics — the challenge that cost Hershey Foods \$150 million in sales when its R/3 system went south this summer — is "not our problem."

Since Plattner is a guest here, I'll try to put this as gently as possible.

Hasso, here in America, we won't hate you for being German. But we will hate you for being a jerk.

Oh, it's not just you. We hate jerks from Microsoft and IBM and Computer Associates and Oracle and Baan and PeopleSoft and every other vendor, too. We hate any vendor who tells us integration with competitors' products is "not our problem." Any vendor who points to customers as afraid or stupid or bigoted. Any vendor, in short, who blames failure on anyone else.

The point isn't who's to blame. The point is that only jerks play the blame game.

We're looking for success, Hasso, not someone to blame. We want your software to work. We've got lots of incentive. Our companies could lose tens of millions of dollars in a single quarter if these ERP systems fall apart after we throw the switch. Failure could cost far more than we're paying you for the software.

If your software doesn't solve our problems, it's worse than useless. That means our problems are your problems.

And if you're having trouble understanding where our problems come in these gigantic, challenging and politically charged projects, here are a few clues:

We've made a big investment in SAP prod-

ucts. So word that we can't easily integrate products from other suppliers doesn't sit well with our executives — even the ones who don't remember the imperial days of IBM.

We're spending huge amounts on consultants who've supposedly earned your blessing for their expertise. So our managers don't want to hear we need to pay still more for SAP's own experts, too.

We've busted the training budget getting up to speed on R/3's intricacies, put in long hours figuring out how to match it to our business needs and strained our brains learning how to think the SAP way. So our IT people have no patience for an SAP expert who — in your own words — "comes in a little cocky" instead of focused on helping us root out our problems.

When we've committed our organizations — both the IT and business sides — to putting SAP products to work, we don't want you telling us about the lousy attitude of SAP's experts, the weak skills of SAP's partners and the inflexibility of SAP's products. We want you to help us overcome those problems.

So forget the excuses, the finger-pointing and the blame game. Work with us. We need a partner who understands how much is at stake for us and who's committed to making every one

of our ERP projects successful — even the ones that aren't 100% SAP.

Because — really — we don't hate Germans. But we do hate jerks. ■

Hayes, Computerworld's staff columnist, has covered IT for 20 years. His e-mail address is frank_hayes@computerworld.com.

Only jerks
play the
blame game.
Stop acting
like a jerk.



SHARK TANK

■ TAMPA TANKSTER claims GTE Data Services is set to release all of its outside consultants until the end of the year. The buzz down there is that GTE needs to make certain dollar numbers in order to look pretty for its Bell Atlantic merger talks. But a GTE Data Services spokeswoman told Sharky: "That's ridiculous, outlandish. Contractors are an important part of our IT business and will remain so."

SO THIS VETERAN data warehousing guy gets a new version of an OLAP tool that stores calculated values as part of the database. In his calculations, he wants to flip the sign of a number, turning 5 into -5 or -3 into 3. Should be simple, but nothing seems to work. He calls the vendor. They recommend multiplying by -1. He does. Next day, all hell breaks loose. All workstations start hanging on any data request. Now the vendor strings the guy along for three weeks before the noticing that the meltdown was caused by... multiplying by -1. That's right, the vendor's recommended fix. With friends like that...

SO A PILOT FISH interviews with a Big Five outfit. The job: Do IT assessments of companies that are merger candidates. You know: Check out the hardware, software, people, contracts, etc. Looked like a nice gig, the

Tankster says — "until I was told I would have one day to ask the right questions, figure out the answers and then make a buy/no-buy recommendation." That's right, eight full hours. To dope out half-billion-dollar deals. Sheesh, they spend more time brewing up the bigwigs' golden parachutes.

ED TOBEN is CIO at Colgate-Palmolive. The \$9 billion company began installing a common set of hardware and software throughout its operations in the mid-'90s. Before that, all IT buying was done locally by the individual business units. He wants to flip the sign of a number, turning 5 into -5 or -3 into 3. Should be simple, but nothing seems to work. He calls the vendor. They recommend multiplying by -1. He does. Next day, all hell breaks loose. All workstations start hanging on any data request. Now the vendor strings the guy along for three weeks before the noticing that the meltdown was caused by... multiplying by -1. That's right, the vendor's recommended fix. With friends like that...

SHARP-EYED MARK was writing his monthly Bell Atlantic check at home. Billing period: 10/13/99 to 11/12/99. Due date: 04/04/04. "Looks like someone was doing some live Y2K testing," Mark writes. "Do you think I should pay it now, or wait the four years?"

Hey, take the phone company at its word and hold on to your dough! All that green will match your Shark Shirt — which any pilot fish picks up by successfully sending a scoop to sharky@computerworld.com. For your daily dirt, zip over to computerworld.com/sharky.

The 5th Wave



"We're much better prepared for this upgrade than before. We're giving users additional training, better manuals, and a morphine drip."

E-mail Rich Tennant at the5thwave@tuc.net

Thinking outside the box led us to this one.

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